# JoLMA

The Journal for the Philosophy of Language, Mind and the Arts

e-ISSN 2723-9640

Vol. 4 – Num. 2 December 2023

Edizioni Ca'Foscari

e-ISSN 2723-9640

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## The Journal for the Philosophy of Language, Mind and the Arts

Editor-in-Chief
Luigi Perissinotto

**Edizioni Ca' Foscari** - Venice University Press
Fondazione Università Ca' Foscari
Dorsoduro 3246, 30123 Venezia
URL https://edizionicafoscari.unive.it/en/edizioni/riviste/the-journal-for-the-philosophy-of-language-mind-an/

**JoLMA**
The Journal for the Philosophy of Language, Mind and the Arts

Six-monthly Journal



**Head office** Università Ca' Foscari Venezia | Dipartimento di Filosofia e Beni Culturali | Palazzo Malcanton Marcorà | Dorsoduro 3484/D - 30123 Venezia | Italia | jolma_editor@unive.it

**Publisher** Edizioni Ca' Foscari - Digital Publishing | Fondazione Università Ca' Foscari | Dorsoduro 3246, 30123 Venezia, Italia | ecf@unive.it




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Scientific certification of the works published by Edizioni Ca' Foscari - Digital Publishing: all essays published in this volume have received a favourable opinion by subject-matter experts, through an anonymous peer review process under the responsibility of the Advisory Board of the journal. The evaluations were conducted in adherence to the scientific and editorial criteria established by Edizioni Ca' Foscari.

**JoLMA**
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e-ISSN 2723-9640

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DOI http://doi.org/10.30687/Jolma/2723-9640/2023/02

# De-Humanizing Cognition, Intelligence, and Agency. A Critical Assessment Between Philosophy, Ethics, and Science

edited by Filippo Batisti

e-ISSN 2723-9640

**JoLMA**
Vol. 4 – Num. 2 – December 2023

# Introduction

Filippo Batisti
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As the guest editor of this issue of *JoLMA*, it is my pleasure to introduce this stimulating polyphonic collection of essays. Readers will find a brief presentation of each at the beginning of the last article (Batisti, this issue).

I must begin by thanking all the authors for having proved so brilliant in accepting the challenge posed by the call for papers. The latter deliberately addressed multiple aspects of a trend relevant to a variety of disciplines: a deep rethinking of the definition of humanness in its relationship with traditional non-human counterparts.

An editorial operation like this comes with risks. It is not rare that invitations to discuss what is thought to be a single topic, and instead emerges as nothing more than a vague suggestion, end up as a regrettable cacophonic ensemble of independent contributions. Instead, all the authors proved that a meaningful multidisciplinary dialogue can be achieved. This outcome goes to their own merit, as the editor did little to guide them in this regard.

I shall add some final words on the results the issue delivers.

The first result that we hopefully achieved is to support the idea that discussions around foundational issues like the redefinition of humanness always benefit from an exchange of views among the relevant disciplinary standpoints. That includes meta-reflections on the discussion itself (Figdor; Colaço; Białek; Batisti, this issue).

The second result is negative, in a way. Despite the commonalities that made this issue readable – i.e. understandable to a satisfactory extent – by any reader from the first to the last article, I cannot blame those who remain dubious about the identification of a single thread that may become a standalone research program. Would that be possible? Definitely. Would that be desirable? This is where skepticism arises. Perhaps it would make sense to think of a unified

study of the post-human. Post-human studies are indeed a growing field that attracts scholars with different backgrounds. However, after editing this journal issue, I find myself more inclined to endorse a multidisciplinary framework for this topic to be treated in a more fruitful and rigorous way.

Why? The philosophical reflection stemming from actual scientific practice, taken together with the feedback of the former directed to the latter, was here proven to have the potential to inform ethical thinking and political practices with a more robust foundation than the ones that do not necessarily relate so closely to scientific developments (Terragni, Cesaroni; Fizzarotti; Joy, this issue). This, of course, is not to endorse an alleged preeminence of science as opposed to speculative philosophical reflection, nor that scientific practices should remain untouched by science-informed philosophy. On the contrary, history and anthropology of science function as antidotes to similar ill-founded views (Raffaetà, this issue). To be clear, the most recent scientific and technological discoveries require an even stronger role of philosophy in public and institutional discussions. Their practical consequences for humans and non-humans cannot be ignored.

I do not assume that the authors I had the privilege of editing necessarily agree with my final assessment, or even with the first one. Nonetheless, this is a discussion we, as self-reflecting humans, need to have to better understand the bases on which we are called to rethink our place in an endangered world.

e-ISSN 2723-9640

**JoLMA**
Vol. 4 — Num. 2 — December 2023

# What Are We Talking About When We Talk About Cognition? Human, Cybernetic, and Phylogenetic Conceptual Schemes

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**Abstract** In this paper I will outline three conceptual schemes for thinking about cognition. One is the anthropocentric scheme that dominated our thinking for thousands of years: human cognition. Another is the approach founded in classical cognitive science and artificial intelligence: cybernetic cognition. The third is the framework of evolutionary biology that encompasses all traits of evolved organisms: phylogenetic cognition. I will explain all three and sketch their current relationships. Each scheme forms the conceptual ground of a valid research programme, but how these programmes and schemes will end up in relation to each other is an open question.

**Keywords** Cognition. Cybernetics. Evolution of cognition. Basal cognition. Cognitive ontology.



Edizioni Ca'Foscari

**Peer review**

Submitted 2023-12-05
Accepted 2023-12-26
Published 2024-02-07



**Citation** Figdor, C. (2023). "What Are We Talking About When We Talk About Cognition? Human, Cybernetic, and Phylogenetic Conceptual Schemes". *JoLMA*, 4(2), 149-162.

**DOI 10.30687/Jolma/2723-9640/2023/02/001**

## 1 Introduction

What are we talking about when we're talking about cognition?[1] This paper will outline three broad conceptual schemes currently in play in the sciences concerned with explaining cognitive abilities. One is the anthropocentric scheme – human cognition – that dominated our thinking about cognition until very recently. Another is the cybernetic-computational scheme – cybernetic cognition – rooted in cognitive science and flourishing in such fields as artificial intelligence, computational neuroscience, and biocybernetics. The third is an evolutionary biological scheme – phylogenetic cognition – that conceptualizes cognition in terms of the phylogeny-based approach we take to all other traits of evolved organisms. These schemes are not pristinely distinguished in practice, but they differ markedly in their conceptions of cognition and ground different research questions and methods. It is also not yet clear how they will end up being related, although I will consider below how they are related at this time.

I'll discuss human cognition in Section 2, cybernetic cognition in Section 3, and phylogenetic cognition in Section 4. The labels pick out conceptual frameworks in which cognitive abilities are defined and investigated, not particular cognitive abilities. In Section 5, I show how these frameworks schemes are related at present, as well as the key questions that remain as we determine their eventual relationships.

## 2 Human Cognition

Psychology as a whole is anthropocentric in multiple unobjectionable ways. Human cognition, perception, and behaviour are its main explananda and most research is devoted to understanding them and their developmental, clinical, and social aspects. A traditional, but separable, component of this anthropocentrism is the human cognitive conceptual scheme: human cognition. This scheme conceptualizes cognition in terms of the suite of human abilities that enable or comprise human thinking. For example, (natural) language is the system for communicating thought that humans have, episodic memory is what humans exhibit when they think about past personal experiences, and so on. Descartes' ([1641] 2017) examples of mental abilities are paradigm cases of cognitive abilities as seen from human cognition: reasoning, imagining, doubting, and the rest are understood in terms of what humans have or do – in his case, necessarily so. Much of our intellectual history, from Aristotle to Kant and beyond, agrees: human cognition is the only possible

1 I thank two anonymous referees for helpful comments on an earlier draft of this paper.

conceptual scheme for thinking about cognition if you think only humans (among earthly denizens) have cognitive abilities (what Aristotle called *nous* or the rational soul).

Even if we disagree with many canonical philosophers on the uniqueness question, we still assume human cognition when we determine whether other species have cognitive abilities or not depending on how similar they are to the human prototype. For example, from this perspective Bennett and Hacker (2003, 19), following Hacker's interpretation of Wittgenstein, are correct that cognitive concepts are essentially anchored in human cognition: "[O]nly of a living human being and what resembles (behaves like) a living human being, can one say that it has sensations; it sees, is blind; hears, is deaf; is conscious or unconscious" (Wittgenstein 1958, § 281). If nonhumans have anything cognitive, it is often qualified as a less sophisticated or "proto-" version; such relative judgments use human abilities as the yardstick. Thus, nothing counts as a (natural) language unless it has the features we recognize in human language (e.g. hierarchical syntax); nothing counts as true episodic memory unless it has the features we recognize in humans (e.g. autonoetic consciousness), and so on.

This classificatory role of human cognition contrasts with that of human perception. Our comparisons of perceptual abilities across species are not conceptually anthropocentric. A species can have vision, not merely less sophisticated or proto-vision, without having human vision; it can become blind by losing its own visual abilities. Folk psychology – our practices of ascribing cognitive abilities to others – is somewhat lax in its use of human cognitive concepts for nonhumans. Descartes never convinced the folk that animals don't and can't feel pain, nor do the folk necessarily agree that only humans have cognitive abilities. In other terms, strictly speaking, within this conceptual scheme ascriptions of cognitive abilities to nonhumans *must* be anthropomorphic, whereas in folk psychology they often are but we allow for some fudging and are not always consistent.

Human cognition may appear to be a straw man nowadays, particularly in some scientific circles. However, it is fair to say this conceptual scheme remains the implicit default in many areas of inquiry concerned mainly with humans, such as most of psychology, social science, and moral, social, and political philosophy. It can even remain potent in the midst of apparent challenge. When Shettleworth (1993) and others called for ending an anthropocentric perspective in comparative psychology in favour of an ecological or biocentric perspective, one of the problems motivating their call was the persistence of cross-species comparisons that still used human cognition as the standard. Classical evolutionary psychology (e.g. Cosmides, Tooby 1987) assumed that to explain the evolution of cognition was to explain the evolution of human cognition in terms of what was

adaptive for humans in the Pleistocene era; the fact that humans are (e.g.) mammals played no explanatory role. Similarly, philosophers and others working in cognitive ontology aim to revise cognitive concepts primarily in the light of fMRI studies of human brains functioning during cognitive tasks (e.g. Anderson 2015; McCaffrey, Wright 2022). For this project, studies of human adult, infant, and impaired human brains and behaviour, cross-cultural studies of human behaviour, and hypotheses of human brain evolution all support inferences to human cognitive abilities and possible revisions within human cognition scheme. But studies of vervet monkeys or corvids are not relevant without a different conceptual grounding for cross-species comparisons than what human cognition can offer.

For some, human cognition may seem inevitable, even inescapable, given our human perspective on cognition. But while human cognition has been our starting scheme, we do not need to end there. The other two conceptual schemes offer non-anthropocentric alternatives.

## 3 Cybernetic Cognition

The most developed alternative is cybernetic (or cybernetic-computational) cognition, the conceptual scheme of classical cognitive science augmented by cybernetics, in which cognition is information-processing in feedback control systems (Wiener 1948; Rosenblueth, Wiener, Bigelow 1943; Figdor 2018). Turing (1950) and Newell and Simon (1961) initiated the interpretation of cognition in terms of information-processing by showing how input-output relationships associated with cognitive processes as defined by human cognition could be carried out by a machine; Wiener further specified that the information-processing was in the service of an agent's environment-responsive behaviour guided by its goals. This fact – that cognition was something done by autonomous agents to achieve their purposes in their environments – could be taken for granted by human cognition given that humans are paradigmatic autonomous agents. It had to be added to Turing's original information-processing approach. At the same time, it is foundational to cybernetic cognition that machines can be autonomous agents. This possibility is ruled out by human cognition.

While cognition as information-processing was originally specified as the manipulation of internal representations according to rules, it has since become a matter of debate what is required for information processing (Piccinini, Scarantino 2011). In particular, information-processing need not require representations on traditional views of what counts as a representation. This loosening of the original theory extends to cybernetic cognition as well. Research programmes in robotics, computational modelling, dynamic systems theory, predictive coding, enactivism, ecological psychology, and others, may be

representationalist or anti-representationalist, but would all count as forms of cybernetic cognition. Acknowledging this loosening of what is required for cognition, Allen (2017, 4241) suggests "adaptive information-processing" as a neutral umbrella label for what cognitive science studies. The label "cybernetic cognition" is similarly neutral but is preferable because it explicitly includes artificial systems: the Darwinian vocabulary of adaptation is not required, and if we redefine "adaptive" to avoid its biological implications, we are just talking cybernetics. Either way, however, cognitive science is not a neutral party in discussions of cognition. It comes with its own specific conceptual scheme, one that is quite distinct from human cognition.

A key commitment of cybernetic cognition is to medium-independence, whereby what feedback control systems are made of doesn't matter for their being classified as such. The philosophical theory behind this is classical functionalism (Putnam 1967; Levin et al. 2021). This commitment guarantees the broad applicability of cybernetic cognition to many systems. When Baluska and Levin (2016, 1) define cognition as "the total set of mechanisms that underlie information acquisition, storage, processing, and use, at any level of organization", whether the system looks or functions like a human being doesn't matter. It also means that cognitive abilities are defined at an extremely high level of abstraction. Memory, for example, is "experience-dependent modification of internal structure, in a stimulus-specific manner that alters the way the system will respond to stimuli as a function of its past" (Baluska, Levin 2016, 2). A cognitive system with memory can be a human, a nonhuman organism, or an artificial autonomous agent, inter alia. This enables cognitive scientists to claim that the differences between a computational model of a brain and a biological brain do not matter: the former exhibits genuine cognition and not something merely analogous to it (Chirimuuta 2021). So while Bennett and Hacker would never consider a computer "just another experimental animal", as neurobiologist J.Z. Young held (Miłkowski 2018, 532), from the perspective of cybernetic cognition Young is correct.

It follows that there is nothing essentially biological about cybernetic cognition. Cybernetic cognitive systems are physical systems, but they do not have to evolve, develop, or be implemented in biological materials. They need not bear any evolutionary relationships to each other, and even if they do, those relationships play no role in distinguishing among cognitive abilities: such differences are not relevant for ascribing cybernetic cognitive abilities. Human cognition is interestingly equivocal on this point. Dualists such as Descartes are in agreement with cybernetic cognition in terms of conceiving of cognition as not essentially biological, although Descartes disagrees with cybernetic cognition in holding it is not physical at all. On the other hand, physicalists who adopt human cognition agree with

cybernetic cognition that cognition depends essentially on physical stuff. But because they limit full-fledged cognition to humans, only the human brain and body provides that physical support. At best, other physical bodies (including artificial ones) may support less sophisticated or "proto-" cognitive abilities.

Finally, cybernetic cognition's foundational commitment to medium-independence has made it the ideal alternative for some of those who reject human cognition, such as advocates of bacterial, plant, and/or basal or minimal cognition generally (e.g., Lyon 2015; Calvo, Keijzer 2009; Baluska, Levin 2016). Bacteria cognition is cybernetic cognition applied to bacteria, plant cognition is cybernetic cognition applied to plants, and so forth. This warm embrace has been facilitated by the fact that cybernetic concepts can easily be given a Darwinian gloss: the goals or purposes are those of homeostasis, survival, and reproduction, and feedback control is interpreted as adaptive responses to environmental contingencies. This is not a merger of equals but an apparently seamless conceptual takeover that promotes explaining biological complexity from a simplifying engineering perspective conducive to research based in computational methods.

In these two conceptual schemes – human cognition and cybernetic cognition – we have gone from a very narrow focus on one biological species to an extraordinarily broad framework that applies to artificial and biological systems equally. This shift from one extreme to another raises an overarching question: what are, or should be, the relevant similarities and differences to use when defining cognitive concepts and kinds? In human cognition, we abstract away from individual differences in human behaviour, bodies, and brains, but differences between humans and nonhumans rule out the latter as full-fledge cognitive entities. In cybernetic cognition, we abstract away from material compositions and embodied behaviours; a system is cognitive as long as it exhibits patterns of behaviour that we can describe using the relevant mathematical models. If you think cybernetic cognition ignores differences that are relevant to cognition while human cognition treats too many differences as relevant, neither human nor cybernetic cognition will be satisfactory. You will want a conceptual scheme that relies on different relevant similarities and differences for defining its cognitive concepts and kinds. Phylogenetic cognition is one such scheme. It shows that to de-humanize cognition is not necessarily to cyberneticize cognition.

## 4 Phylogenetic Cognition

Phylogenetic cognition is a newcomer to the cognition game. In contrast with both human and cybernetic cognition, phylogenetic cognition defines cognitive abilities using a standard biological scheme for defining all other evolved traits. In evolutionary biology, characters are evolved traits that are defined (individuated) across species; these can be distinguished from phenotypes, which are the evolved traits of particular species that are specific ways of having a character (Figdor 2022). Phylogenetic cognition adopts this basic dual conceptual scheme. What we are talking about when we talk about cognition are both cognitive characters and cognitive phenotypes. Neither human nor cybernetic cognition has a similar distinction. So some further explanation will be helpful. Phenotypes are largely familiar, but characters are not.

Although there are several character concepts in biology, the phylogenetic character concept is dominant because these characters are used to construct phylogeny (e.g., Wagner 2001, 2014). Characters encapsulate evolutionary-historical information about how and when an ability or feature originated and how it evolved and differentiated in phylogeny.[2] They are defined by abstracting away from some species-specific details while treating others as relevant similarities. For example, the forelimb character is common to all tetrapods and helps define that major clade (or monophyletic group), which comprises the original tetrapod species and all and only those species descended from it.[3] But different tetrapod species have different forelimb phenotypes, all of which are species-specific ways of having the same forelimb character. This means that to define the forelimb character, biologists abstracted away from the many differences between dolphin dorsal fins, bat wings, and monkey arms, inter alia, to isolate the relevant similarities across all these species, such as relative position in the body and developmental origin. Phylogeny itself – the tree of life – is a nested hierarchy of such clades, where

2 The homology concept is closely related to this phylogenetic character concept: homologs are characters that are shared by two species because they both inherited it from their last common ancestor. Characters used to create phylogeny are homologs. When characters are shared across two species for reasons other than common ancestry (typically, common environmental pressures), they are homoplasies (a.k.a. are convergent or independently evolved characters). Thus, being an acoustic communicator is a character mapped to phylogeny – in particular, to birds, mammals, and amphibians – that is thought to have evolved independently in these clades (Chen, Wiens 2020); species in these groups did not inherit it from their last common ancestor. As the acoustic communication character shows, it is likely that many cognitive characters will have evolved convergently in distinct branches of phylogeny.

3 Snakes are a case of reversal, whereby a species loses a character that was possessed by its last common ancestor with other tetrapods. They are still classified as tetrapods.

small clades of species that share one or more narrowly possessed characters (e.g., having hair) are nested in ever larger clades of species that share more widely possessed characters (e,g., having vertebrae) until we reach the broadest level of biological classification (the domains of bacteria, archaea, and eukarya).

The fact that characters are individuated across species ensures that claims about which species have (or do not have) a character are *a posteriori*. For example, it is trivial to say that a given cognitive (or other) phenotype is unique to a species – phenotypes are species-specific, after all – but it is significant when a cognitive (or other) character is unique to a species. From the perspective of phylogenetic cognition, human cognition mistakenly uses human cognitive phenotypes to define cognition, making it *a priori* that only humans have cognitive abilities. It also means defining characters is a difficult business, given that the same character can be determined in phenotypes that differ markedly in form and/or function from each other. Differences in the phenotypes that determine the tetrapod character (noted above) is one example of many. Characters are modified within each species' lineage to fit the lifestyle of each species that has it. While these species-specific differences are extremely important for defining the phenotypes, they are not relevant for defining the character. To use a Cartesian example: human reason (the phenotype) might be characterized in certain ways that are not shared by other species, but it does not follow that other species don't have reason (the character), each in its own way.

This phylogenetic framework may be new for cognition, but it is well established when it comes to defining behavioural and perceptual characters and using them in various research contexts.[4] For example, after mapping acoustic communication to a phylogeny we can empirically test whether it is correlated with nocturnal or diurnal lifestyles (Chen, Wiens 2020). Duda and Zrzavy (2013) use a suite of life-history and behavioural characters, such as post-natal growth rate, social structure, dispersal patterns (philopatry), tool use, and others, to propose a hominin lineage. Brain characters have been elaborated in sufficient detail to enable us to identify a primate brain character, of which the human brain is a species-specific phenotype (Herculano-Houzel 2012). And some researchers suggest leveraging what we know about the evolution of brains (neural characters) to reconsider how to define perception, cognition, and action (Cisek 2019).

4 Griffiths (1997) introduced the idea of individuating emotions as characters; others (e.g. Matthen 2007, Ereshefsky 2007) have tended to focus on the homology concept rather than the character concept directly.

A specific illustration of how phylogenetic cognition can be developed can be found in some episodic memory research.[5] Episodic memory was originally defined from a human-cognition perspective as a memory of a past experience (Tulving 1972); our only subjects were humans and our main (often only) behavioural evidence was verbal report. Experiments with naturally food-caching corvid species showed abilities to recall what particular food items were stored, where, and when (Emery, Clayton 2004). This sparked debate as to whether the birds had episodic memory or just something similar to it, using the human-cognition yardstick. Tulving (2005) held that true episodic memory could only be human because it requires autonoetic consciousness, and only humans have autonoetic consciousness. One response to this challenge was to reject the autonoetic criterion (Allen, Fortin 2013). This made the concept more widely applicable at the cost of making it less useful for drawing important distinctions (such as distinguishing episodic from semantic memory). Clayton and Russell (2009) take another tack: they de-humanize the concept of autonoetic consciousness so that nonhuman phenotypes can be cases of real autonoetic consciousness. Very briefly, they suggest that what is essential for autonoetic consciousness is an egocentric spatial perspective relative to the recalled event. We don't have widely accepted criteria of consciousness in other species, so the suggestion is still quite speculative. But their move towards defining episodic memory as a character is clear: modulo satisfying the other criteria, each species that has autonoetic consciousness, and thus episodic memory, would have it in its own species-specific way. Scrub jays would not be ruled out by definition from having real episodic memory. Yet the definition is not so weak that it loses its scientific utility. We can still use it to distinguish between species that have true episodic memory and those that do not.

This same example can be used to underline some key differences between the three conceptual schemes. One key difference is the types of abstractions, or similarities and differences, that each considers relevant when defining cognition. For phylogenetic cognition, the many differences between humans and (e.g.) scrub jays are not relevant for defining episodic memory across both species. Both can have episodic memory, even if each has it in its own species-specific way. For human cognition, the differences between humans and scrub jays are relevant. Humans alone have true episodic memory because they alone have true autonoetic consciousness, defined in terms of the human phenotype; it follows that what scrub jays have is at best only episodic-memory-like. For cybernetic cognition, humans and scrub jays

5 This example of episodic memory is based on a somewhat longer discussion in Figdor 2022. A fuller treatment is in preparation.

both have memory (defined as above by Baluska, Levin 2016), and episodic memory is not in its conceptual repertoire. Cybernetic cognition does not distinguish humans, scrub jays, or any other cybernetic system in terms of memory, and it is silent about anything more specific.

This key difference can also be shown in the debate over cognitive abilities in plants (e.g. Segundo-Ortin, Calvo 2022). Human cognition says plants do not have cognitive abilities because they are too dissimilar to humans. Cybernetic cognition says plants have cognitive abilities because they, like humans, are adaptive systems that use environmental feedback to modify their behaviour. Phylogenetic cognition says it is an open question whether plants have cognitive abilities, because we don't yet know how cognitive characters of various types will be defined and mapped to phylogeny. Some cognitive characters may be shared across animals and plants, others may be specific to animals, and others might turn out (*a posteriori*) to be unique to humans.

A second key difference between the conceptual schemes is in terms of the inferences to cognitive abilities we might make from known instances. Consider any clear case of a cognitive ability that (unimpaired) adult humans have when they exhibit certain behaviours. We then observe what seem like many of the same behaviours in another individual. For human cognition, we can infer to that cognitive ability with reasonable strength and confidence if the new individual is also a human. Inferences to any nonhuman are strictly speaking unjustified; we can infer to abilities that are similar but not full-fledged. For cybernetic cognition, we can infer to that ability with equal strength and confidence in any artificial or biological individual as long the behaviours are captured by the same formalisms or models. For phylogenetic cognition, we can infer with variable strength and confidence to any organism depending on what species it belongs to, and therefore what phylogenetic relationship it has to species that have the ability. In our hypothetical case, we are inferring from a human to a nonhuman organism, but starting from a human is not required.

## 5 Relating the Conceptual Schemes

I leave it as an exercise to the reader to determine which of these schemes their current uses of cognitive vocabulary best fall under. What is clear is that discussion of cognition is massively ambiguous between these conceptual schemes, engendering plenty of verbal disputes over what is really cognition. As I see it, each conceptual scheme has a perfectly legitimate claim to the term "cognition", to defining specific "cognitive" processes within its framework, and to applying those concepts to whatever phenomena are considered within its scope. This scope will in turn determine its basic investigative

orientation – humans, mathematical models, organisms – and the appropriate methods for carrying out research within that orientation.

But it is too early to think this supports pluralism. Pluralism implies that different investigative orientations can co-exist in relative peace for the most part. Different investigators look at different aspects of a complex phenomenon and may make particular assumptions appropriate for their research that are not in fact compatible with those made by others. But pluralism is not conceptual chaos. The disorientation that many feel trying to understand cognition in the contemporary context supports Aizawa's (2017) point that the sciences of cognition are in a period of "revolutionary" science, where fundamental questions are in dispute. How these three schemes will eventually be related – including, potentially, pluralism – will depend on how certain foundational questions are answered.

First consider phylogenetic cognition and human cognition. This relationship is simple once we accept that human cognitive abilities evolved just as any other human phenotype evolved. If our cognitive abilities are non-trivially unique, we will still need cognitive characters in order to make that *a posteriori* determination. With this basic evolutionary orientation accepted, human cognition is a species-specific special case of phylogenetic cognition. It is the conceptual scheme of human cognitive phenotypes, which are determinates of cognitive characters the way our arms are determinates of the forelimb character. Importantly, there is no conflict between investigating cognitive characters and investigating the human cognitive phenotype. Many researchers in psychology and philosophy of psychology will continue to focus on the human cognitive phenotype. Cognitive ontology can continue to be a thriving research area aimed at revising or reconsidering human cognitive phenotypes in the light of neuroscience. However, any revisions must also take into account the character that the human phenotypes are determinates of. In other words, human cognitive phenotypes will be partly defined by features not specific to humans, the way the human forearm is partly defined by what it is to be a forelimb. Meanwhile, researchers more interested in phylogenetic cognition will be keen to distinguish those features of human cognitive phenotypes that are specific to humans and those are shared with other species and help define the characters. We will also be interested in determining how non-cognitive characters at other levels of biological organization – genetics, morphology, development – constrain behavioural and cognitive characters, and thus constrain human cognitive phenotypes too.

Unfortunately, the relationship between phylogenetic cognition and cybernetic cognition is not so simple, and will need a great deal more work before it will be understood. This uncertainty also affects human cognition given its relation to phylogenetic cognition. The basic issue is medium-independence: we don't know which (if any)

biological details might be relevant to cognition and which are not. Since cybernetic cognition abstracts away from all of them, it implies that none of those details matter. We actually don't know if that is true. For example, Chirimuuta (2021) notes that the abstractions of computational models of the brain leave out aspects of neurons and neurophysiology that matter for cognition. As a result, it may be that computational models merely involve artificial kinds that are convenient for computational neuroscientists. More broadly, we don't know if computational models capture what is relevant to biological cognition or if the models don't really tell us very much about it.

As a result, the relationship between phylogenetic (and human) cognition and cybernetic cognition is unclear. It could be that phylogenetic cognition is a special case of cybernetic cognition with some additional restrictions; human cognition would then be a special case of this special case. But it is also possible that they do not nest in this way, or that they end up in some more complicated relationship, and in this case some form of cognitive pluralism might be the outcome.

## 6 Conclusion

I have presented three conceptual frameworks currently in play in scientific and humanities research on cognition: human cognition, cybernetic cognition, and phylogenetic cognition. All provide a legitimate ways to talk about cognition but they are in apparent conflict in various ways. Clarifying each conceptual scheme can help give us distinguish which disputes about cognition may be verbal (for example, whether human cognition is unique) from those which are fundamental (for example, the role of biological composition in cognition). I have also argued that the relationship between all three is still unclear. Human cognition is easily understood as a special case of phylogenetic cognition, but the relationship between phylogenetic cognition and cybernetic cognition is an open, and difficult, question.

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e-ISSN 2723-9640

**JoLMA**
Vol. 4 — Num. 2 — December 2023

# Connecting Unconventional Cognition to Humans
## Unification and Generativity

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**Abstract** The idea of applying cognitive kind terms and concepts to 'unconventional' systems has gained steam. Perhaps unsurprisingly, this idea also has been met with skepticism. There is an implicit worry amongst skeptics that the idea of applying cognitive kind terms and concepts to non-humans, or at least to non-humans that are anatomically quite unlike humans, amounts to a Mere Honorific Conclusion: to say that a system is cognitive is to say it is merely worthy of investigation. In this paper, I use this conclusion as a framing device for exploring how we ought to approach the idea of cognition in unconventional systems, and I explore two avenues for blocking it: unification and generativity.

**Keywords** Cognition. Unconventional Cognitive System. Memory. Unification. Generativity.



Edizioni Ca'Foscari

**Peer review**

Submitted 2023-09-30
Accepted 2023-11-12
Published 2023-12-20

**Open access**



**Citation** Colaço, D. (2023). "Connecting Unconventional Cognition to Humans. Unification and Generativity". *JoLMA*, 4(2), 163-178.

**DOI 10.30687/Jolma/2723-9640/2023/02/002**

## 1 Introduction

The idea that we ought to 'de-humanize' cognition, or apply cognitive kind terms and concepts to non-human, 'unconventional' systems (Baluška, Levin 2016) has gained steam in philosophy and cognitive science.[1] This development is in part a response to reports of cognition or specific cognitive activities, such as memory, in plants (Gagliano et al. 2016), single-celled organisms (Gershman et al. 2021), and slime molds (Dussutour 2021). Likewise, it in part reflects the implications of innovative theorization, including 4E (extended, embedded, embodied, and enactive) cognition (Menary 2010), the biogenic approach to cognition (Lyon 2006), and basal cognition (Levin 2021). Perhaps unsurprisingly, the idea of studying cognition in unconventional systems also has been met with skepticism by a diverse group of philosophers and scientists. Some examples of objections include claims that uses of cognitive kind terms in these cases are non-literal (see Figdor 2018), explanatorily unnecessary (Adams, Garrison 2013), or evolutionarily ill-motivated (Taiz et al. 2019). This provides a precis of the proponents and skeptics in what I call 'the unconventional cognition debate'.

Though not explicitly stated, there is a worry amongst skeptics that the idea of applying cognitive kind terms and concepts to non-humans, or at least to non-humans that are anatomically quite unlike humans, amounts to what I dub a Mere Honorific Conclusion (MHC): to say that a system is cognitive is to say that the system is merely worthy of philosophical and scientific investigation. This conclusion equates to saying that (say) 'non-human systems make decisions' simply amounts to saying that 'non-human systems exhibit a phenomenon that is worthy of investigation'. Even if this latter claim is true, such a conclusion leaves open a rebuttal: non-humans might exhibit phenomena worthy of investigation, but this alone does not supply any reason for us to treat them as cognitive.

For my contribution to this collection on "De-Humanizing Cognition, Intelligence and Agency", I use MHC as a framing device for exploring how we ought to approach the idea of cognition in unconventional systems. While I doubt that any proponent in the unconventional cognition debate would explicitly accept this conclusion, the facts that (1) proponents admit some dissimilarities between human

1 Like others, I use the term 'unconventional' to refer to systems that traditionally have not be thought of as cognitive, which is not intended to be a rigorous taxonomic criterion. I include aneuronal organisms, collectives, non-neuronal biological systems (such as the immune system), and artificial systems. I appreciate the label because it reflects that whether a system is conventional is based on perspective of the community rather than the characteristics of the systems. Were another perspective dominant, this labeling might change.

and unconventional cognitive phenomena, and (2) arguments provided by proponents are both empirical and conceptual in nature raise concerns about what, over and above an honorific, it means to apply cognitive kind terms and concepts to these systems. In Section 2, I make MHC precise, describe why it would be an unfortunate conclusion, and show why a skeptic might draw this conclusion in this debate.

I explore two avenues for blocking MHC in the unconventional cognition debate. The first avenue relates to the role of unification. I address the potential for this research to conceptually unify cognition, including in humans. I address the upshots of this avenue in Section 3. The second avenue relates to the role of generativity. I address the potential for this research to generate and orient new research on cognitive systems, including humans. I address the upshots of this avenue in Section 4. I conclude by arguing that research on cognition in unconventional systems must connect to the study of human cognition if MHC is to be blocked. By taking both avenues seriously, proponents of the unconventional cognition debate can set up their stance as a research program. A research program of this character has the potential to connect the study of cognition in humans and its study in unconventional systems, producing valuable insights about both in the process.

## 2 A Mere Honorific Conclusion?

A common sentiment amongst skeptics in the unconventional cognition debate is a tentative willingness to grant that the phenomena that are reportedly elicited from these systems are worthy of investigation but a denial that sufficient reason has been presented for them to grant that these phenomena are cognitive.[2] For instance, when discussing phenomena elicited in studies on plants, Adams reports that he suspects "that what is really impressing [proponents] are the information-handling and feedback controlled direction of plant behavior", but he notes that this activity "[d]oes not rise to the level of sufficiency to warrant the label 'cognitive processing'" (2018, 22). Likewise, Ten Cate notes that the phenomena elicited in the study of plants are "intriguing" (2023, 1), but he suggests that these phenomena "seem to be labelled as 'cognitive' mainly because they are beneficial" to the organism in question (2023, 3). Finally,

2 This sentiment is not held for all reports. For instance, follow-ups indicate that association studies in pea plants (Gagliano et al. 2016) do not replicate (Markel 2020). A replication failure undercuts defenses for the claim that these phenomena occur (Colaço 2018). Proponents aim to replicate the study (Segundo-Ortin, Calvo 2023), but see Colaço et al. 2022 for worries about these attempts.

Robinson and colleagues agree that plants "are highly complex organisms featuring multiple interactions with their environment", but they argue that proponents "appeal to psychological and neurobiological concepts… without providing empirical basis for such a far-reaching proposal" (2020, 1).

These examples show that skeptics do not always deny that interesting phenomena occur in unconventional systems. What they are skeptical of is that these phenomena are cognitive. The strongest reading of this skeptical take, which I use as a framing device in this paper, is what I call a Mere Honorific Conclusion:

> **Mere Honorific Conclusion (MHC):** To apply a cognitive kind term or concept to a system is to say that the system is merely worthy of philosophical and scientific investigation for the phenomena that are elicited from it.

By "cognitive kind term or concept", I refer to terms and concepts that are used in philosophy and cognitive science to pick out the relevant cognitive systems, capacities, or phenomena. This set includes 'cognition' as well as COGNITION, but MHC also can be directed towards terms and concepts for specific cognitive activities like memory, decision-making, and consciousness.[3] MHC is thus not equivalent to suggesting that uses of these terms are metaphorical or exaggerations, though it is not wholly incompatible with these conclusions.

MHC would be an unfortunate conclusion to draw, as appeals to cognitive kind terms and concepts as mere honorifics waters them down (Rupert 2004). 'Cognition' and other terms, when used traditionally, are intended to denote that the system in question possesses key properties or exhibits key phenomena that align with the intension of these terms. These terms are intended to refer to cognitive kinds, the tokens of which we can systematize and perhaps explain via reference to these kinds. Honorifics are not vacuous: uses of these honorifics at least suggests that interesting phenomena can be elicited from these systems, which is an empirical position that can be and has been challenged (see fn. 1). Nonetheless, the fact that the systems are worthy of investigation does not tell us anything about the characteristics of the phenomena that can be elicited from these systems. If there are no inferences to be drawn between human cognition and unconventional 'cognition', there is good motivation for not using the terms in this way.

MHC thus is a distinct conclusion from one in which cognitive kinds ought to be dissolved into multiple kinds (Ramsey 2021). Were

3 Correspondingly, it can be applied to predicates that incorporate these terms (Figdor 2018), such as 'plants remember'.

there distinct kinds of cognition – that of humans and that of unconventional systems – one might argue that uses of cognitive kind terms and concepts are incommensurable, which might motivate cleaving human cognition and cognition in unconventional systems into distinct categories. MHC, by contrast, suggests that there is no honorific-independent motivation to call unconventional systems and the phenomena that can be elicited from them 'cognitive'. There is no widespread historical tendency to conceptualize these phenomena in terms of cognition, nor do the characteristics of these phenomena match how cognition has been conceptualized. All that these terms and concepts connote when applied to unconventional systems is that they are worthy of investigation, MHC indicates, which instead might motivate simply no longer applying these terms and concepts to these systems. Researchers can still study these systems, but they should do this because they are independently interesting and worthy of investigation, not because they are cognitive.

I strongly doubt that any proponent in the unconventional cognition debate explicitly commits to MHC. Nonetheless, there are two features of these proponents' positions that offer defeasible support for drawing this conclusion. The first feature is that proponents recognize that there are distinctions to be made between cognition in humans and in unconventional systems. The design of studies on humans and non-humans is different, as evidenced by the sorts of operationalizations, manipulations, and measurements that are made when studying association in pea plants (Gagliano et al. 2016) as opposed to those made when studying association in rodents (Ennaceur, Delacour 1988). Likewise, functional attributions in non-humans often have a teleological flavor to them (Ten Cate 2023), while attributions in humans more often follow a causal functional analysis (Cummins 1975). Further, the mechanistic schema sought to explain these phenomena in unconventional systems, when they are understood at all (Ten Cate 2023), often have marked differences in entities and activities when compared to humans (see, e.g., Taiz et al. 2019).

Proponents can argue that many of these cases are distinctions without a difference, as proponents and skeptics alike permit operational, functional, and mechanistic distinctions when comparing human cognition to those of other mammals like rodents (Colaço et al. 2022). Likewise, proponents can also appeal to analogical reasoning from humans to non-human animals and back. This type of reasoning is common, though not all together uncontroversial, in comparative cognition (Andrews 2009). Nonetheless, these distinctions must be addressed, lest they support the idea that the only deep similarities between these cases are their worthiness of investigation, leading to MHC.

The second feature of proponents' positions that offers defeasible support for this conclusion is that the unconventional cognition debate is both empirical and conceptual. The empirical dimension

is salient: we can debate what phenomena can be elicited and how these phenomena should be characterized (Colaço 2020). However, the conceptual dimension should not be overlooked. Some proponents aim to fit their appeals into established paradigms for addressing cognition in humans and other mammals, such as Segundo-Ortin and Calvo's (2023) appeals to Shettleworth's descriptions of cognition (2010). However, many implicitly or explicitly adopt approaches that run counter to the mainstream of cognitive science. Recently, I put this point in the context of the plant cognition debate. It "is not about whether plants meet a set of well-delineated and agreed-upon criteria according to which they count as cognitive" (Colaço 2022b, 452). Rather, this debate is at least in part one over the appropriate answer to what cognition is.

Several approaches to conceptualizing cognition are put forward by proponents in the unconventional cognition debate. For instance, several proponents are sympathetic to accounts of enactivism (see, e.g., Segundo-Ortin, Calvo 2023). Lyon, by contrast, has introduced the biogenic approach to cognition, which "starts with the facts of biology as the basis for theorizing and works 'up' to the human case by asking psychological questions as if they were biological questions" (Lyon 2006, 11). This approach posits cognitive principles that are informed by evolutionary biology, self-organizing complex systems, and autopoiesis. One principles states that cognition "relates to the (more or less) continuous assessment of system needs relative to prevailing circumstances, the potential for interaction, and whether the current interaction is working" (Lyon 2006, 19).

Yet another approach is basal cognition, which draws a "continuum between the humble origins of information processing in the metabolic homeostatic mechanisms of ancient cells and more complex learning, representation, and goal directed activity" (Levin 2021a, 117). According to this approach, cognition is "necessary for any autonomous biological system's survival, wellbeing and reproduction" (Lyon et al. 2021, 4). While the latter views are described in terms of being an 'approach' rather than a full-blown theoretical or conceptual framework, each of them involves some construal of what cognition is or what specific cognitive activities are. Thus, each approach speaks to our conceptualization of cognition.

The fact that the debate is in part over what cognition is lends prima facie support to MHC. If proponents are also (say) supporters of enactivism or basal cognition, then their attempts to show that unconventional systems fit a conceptualization of cognition that is consistent with these approaches will not help to sway skeptics who are already unsympathetic to these approaches. In fact, traditionalists, such as supporters of a representational theory of mind, might take the fact that other accounts of cognition are too permissive to be a point against them (Adams 2018). As the saying goes: one person's

modus ponens is another's modus tollens. If skeptics are not sympathetic to these alternative approaches, then merely showing that an elicited phenomenon meets the criteria for one of these approaches might provide a reason to accept that this phenomenon occurs, but this is not equivalent to showing that this phenomenon ought to count as cognitive. Hence, skeptics can recognize that the phenomenon occurs and is thus worthy of analysis, but they can also deny that calling it cognitive means anything more than this, leading to MHC.

## 3 The Unification Avenue

With MHC stated, I explore two avenues for blocking it in the unconventional cognition debate. The first of these avenues involves the aim of unification. Specifically, the idea is that the study of unconventional cognitive systems might offer new insights into cognition generally, allowing philosophers and scientists to achieve a unificatory account of all these systems that results in an extension of our use of cognitive kind terms and concepts in the process.

The aim of unification in the unconventional cognition debate is shown in a recent discussion by Levin, a key adherent of basal cognition. Paraphrased from a talk of his (2021b), Levin states that skeptics in the debate often accept that the research he and other proponents conduct is valuable and the phenomena they elicit are worthy of study, but they question why we ought to use cognitive terms to describe it. What, they question, is gained from calling the phenomena elicited from unconventional systems 'cognition' rather than (say) 'schmognition'? The spirit behind this skeptical question, it should be noted, is very much in line with MHC. Levin's response to this question, reflected in some of his publications (see, e.g., Fields et al. 2020), is that partitioning these phenomena via different terms undercuts our ability to provide a unified account of them. The aim of basal cognition, in other words, is to account for unconventional as well as human cognition.

This paraphrased discussion captures that unification goes beyond simply showing that the phenomena elicited from unconventional systems are similar to those in humans. Figdor, for example, highlights the use of analogical reasoning between humans and alleged unconventional cognitive systems like plants and bacteria. Fidgor's examples show that researchers often argue that phenomena elicited in unconventional systems are qualitatively similar to those elicited in humans (2018, 30), and they also argue that phenomena in these systems match models of human phenomena, establishing a quantitative similarity as well (2018, 55). Nonetheless, these espoused similarities do not alone serve as reason to defend that these systems are cognitive. Qualitative similarities need not capture what is constitutive

of cognition or a cognitive ability. For instance, memory formation might involve signaling or storage, but showing that a phenomenon involves signaling or information storage of a sort does not entail that this phenomenon meets the total set of criteria traditionally associated with memory (Colaço 2022a). Likewise, the fact that a single model adequately represents phenomena of human cognition and those of unconventional systems does not prove that they are the same kind of phenomenon, as one strength of modeling is that we can use a model to represent or explain otherwise diverse phenomena (Batterman, Rice 2014). For instance, some proponents in the unconventional cognition debate model memory in terms of the Free Energy Principle (Gershman 2023), but this principle can be applied to a variety of phenomena that are otherwise different from one another. These examples indicate that, while a perceived similarity might be worthy of investigation, the sort of unification desired by some proponents in the unconventional cognition debate demands something more than relating phenomena elicited from unconventional systems to established qualitative descriptions or quantitative models currently used in cognitive science.

If determining similarities or promoting analogical reasoning is not sufficient for blocking MHC, what more is needed to fulfill proponents' unificatory aims? Figdor supplies an answer to this question, noting that the qualitative and quantitative similarities between humans and unconventional systems might "provide reason to reconsider what the terms mean when applied to humans" (2018, 58). Thus, proponents should not just try to fit phenomena elicited from unconventional systems into how we currently use cognitive kind terms and concepts. Instead, these proponents are better off trying to change how we think about cognition across the board, including how it manifests in humans. The aim of unification here is conceptual: if we want to de-humanize cognition, we ought to revise our cognitive kind terms and concepts rather than merely accommodating unconventional cognitive systems with them.

The unification avenue cannot consist in just presenting unconventional cognitive cases as defense for alternative approaches to conceptualizing cognition (or vice versa). As I mentioned in Section 2, one person's modus ponens is another's modus tollens: if skeptics reject these alternatives, then showing that the alternatives apply to systems that the skeptics do not want to count as cognitive is not going to convince them otherwise, nor should it. Instead, I wager, proponents ought to focus on the existing limitations of accounting for phenomena in systems that both proponents and skeptics agree are cognitive. That is, part of the unconventional cognition debate ought to orient itself to the assessment of cognitive phenomena in humans. Correspondingly, part of the conceptual dimension of the debate ought to challenge the applications of cognitive kind terms and concepts to humans.

While many proponents in the unconventional cognition debate are dissatisfied with understanding cognition solely or even principally in terms of humans, I take it as a (hopefully uncontroversial) point of agreement that no one who wants to 'de-humanize' cognition desires to end up with a view according to which humans do not count as cognitive systems. Rather, I expect that they aim to end up holding that humans are cognitive systems, even if they are not (nor should we assume them to be) the exemplars of these systems. If my presumption is correct, then it stands to reason that these alternative approaches should help to illuminate human cognition just as they help to illuminate cognition in unconventional systems. The unification avenue thus can contribute to accounting for the phenomena that lie in the extension of cognitive kind concepts as understood by both sides of the debate. In other words, the unification avenue can contribute to accounting for phenomena to which all concepts of cognition in this debate apply.

The unification avenue does not begin with a single concept of cognition whose intension demarcates a set of phenomena in its extension. Rather, it begins with a set of phenomena that overlaps the extensional spaces of different concepts in the unconventional cognition debate.[4] This set is thus a shared space that everyone in the debate aims to account for, and, if the point of agreement is indeed uncontroversial, it includes cognitive phenomena that occur in humans. Our accounts of human cognition are not settled affairs. Looking at cases in human memory science as one set of examples, there are numerous reports of odd memory phenomena, referred to as "memory quirks" (Cleary, Schwartz 2020), that are difficult for researchers to characterize let alone explain and square with existing memory theories and models. Likewise, there is a continued debate over the mechanisms that underwrite human memory phenomena. For instance, many scientists, some of whom are proponents in the unconventional cognition debate, argue that human memory phenomena, including memory encoding, storage, and retrieval processes, cannot be accounted for solely in terms of synaptic activity. These scientists push the position that intracellular molecular mechanisms play an ineliminable and distinct role from synapses in humans and other organisms, though this is a controversial position (see Colaço, Najenson 2023). One strength of the unification avenue is that the investigation of unconventional cognitive systems might lead to new insights in conceptualizing and ultimately accounting for these human phenomena in addition to phenomena in unconventional systems.

This should be part of the unconventional cognition debate: proponents should aim to bring insights from unconventional systems to bear on human cognition in an endeavor to unify our accounts of

4 See Akagi 2018 for more details on concepts and their extensional spaces.

cognition and address human phenomena that are not well-captured by existing accounts. Proponents can home in on the properties that cluster amongst phenomena all agree are cognitive and can separate them from properties that do not. While this avenue alone does not guarantee that those in the debate will identify the essential features of cognition, if there indeed are such features, it provides a method for systematizing and explaining phenomena that all agree are cognitive by connecting them to what we learn about phenomena in unconventional systems. Some proponents in the debate pursue this avenue. It is evident in Lyon's criticisms of 'anthropocentric' approaches failing to account for many human phenomena (2006) or Ciaunica and colleagues' arguments that insights from cognition in single-celled organisms should inform our understanding of cellular cognitive mechanisms in the human brain (2023). Crucially, these pursuits are intended to extend insights from alternative approaches to conceptualizing cognition, filling out or challenging our understanding of human cognition and the neural mechanisms that ostensibly underwrite it. These concepts deployed in these cases are not intended to explain; they are intended to orient research that will help to characterize and explain human phenomena that currently are neither well-characterized nor well-explained (Colaço 2022a).

These cases show an upshot to pursuing a unification avenue. Fitting unconventional cognitive systems to existing accounts of human cognition, as currently understood, is inadequate. New conceptualizations of cognition should also give new insight into humans, just as they do for the unconventional systems. Unless proponents aim to defend the idea that there is no shared set of phenomena in the extensions of different concepts of cognitive kinds in this debate, at which point MHC rears its head, a unification avenue allows them to connect conceptualizing via shared phenomena for which they can account. This pursuit should be done in the endeavor to conceptually unify these systems while simultaneously changing how we conceptualize cognition across the board, blocking MHC in the process.

## 4 The Generativity Avenue

The second avenue for blocking MHC in the unconventional cognition debate involves the aim of generativity. Specifically, the idea is that the study of unconventional cognitive systems can orient new research on cognitive systems, allowing philosophers and scientists to discover novel phenomena that they likely would not discover if they were not oriented to them. The generativity avenue is based on the conjecture that there are new phenomena to be discovered in unconventional systems as well as in humans, and conceptualizing cognition in new ways can inform these discoveries.

Several proponents in the unconventional cognition debate suggest that there is a generative aim in their research. For instance, Lyon emphasizes her aim of "stimulat[ing] debate about the correct way to proceed to answers" in debates over what cognition is when describing her biogenic approach (2006, 11-12). Likewise, supporters of basal cognition note that, in conceding cognition to unconventional systems, their focus is on: "Whether proceeding as though this were the case, in a biologically realistic fashion, is productive" (Lyon et al. 2021, 14). In another approach called cobolism, Keijzer argues that his approach both fits existing cases and suggests: "new research on phenomena that have cognitive characteristics irrespective of whether we are currently willing to call these phenomena cognitive" (Keijzer 2021, S152). The ideas of stimulating research, being productive, and suggesting new research all reflect the generative dimension of research on unconventional cognitive systems.

While discovering and characterizing phenomena can be valuable to philosophical and scientific analysis, this generativity alone need not block MHC. As I mentioned in Section 2, skeptics in the unconventional cognition debate seem amenable to accepting at least some reports of novel phenomena in unconventional systems. Where they express skepticism is in considering these phenomena as relevant to the study of cognition. If these novel phenomena are only counted as cognitive according to alternative approaches to conceptualizing cognition, skeptics seem justified in resisting these approaches as appropriate and remaining steadfast in the idea that applying cognitive kind terms and concepts to these phenomena does nothing more than reflect that these phenomena are worthy of investigation. As with the unification avenue, some additional connection must be made between these phenomena and how skeptics already use these terms and concepts.

Indeed, definitions that proponents have presented are often broad, leading some skeptics to question the value of these definitions for studying cognition. Focusing again on memory, one example of these broad definitions is from Lyon's biogenic approach, where memory is "the capacity to retain information for a length of time greater than zero" (Lyon 2006, 20). Another example is from Baluška and Levin, consistent with basal cognition, where "memory can be defined as experience-dependent modification of internal structure, in a stimulus-specific manner that alters the way the system will respond to stimuli in the future as a function of its past" (Baluška, Levin 2016, 2).

Adopting these definitions heuristically might help us to orient researchers to the discovery and characterization of phenomena in unconventional systems that they might not find otherwise, the skeptic might say, but their broadness does little to help with the study of memory in humans. Further, the skeptic might continue, these

definitions show that memory in humans, traditionally defined in a far richer way, is only superficially similar to these 'memory' phenomena in unconventional systems (Colaço 2022a). Without much substance connecting these definitions to the study of memory more generally, MHC is not blocked.

One option that might provide a block to MHC in this case is for us to think of these definitions as hypotheses that orient research and are tested via this research, as opposed to treating them as expressions of what (in this case) memory is. In recent work, I have argued that these broad definitions are hypotheses: "The content of the definition orients researchers to its test, and researchers adopt it because its content demarcates phenomena on which they test" (Colaço 2022a, 93). This allows researchers to "investigate phenomena to which the definition applies, which they may not do if it did not apply to these phenomena" (93).

The idea is for proponents and skeptics to test the definition against the set of phenomena in its extension, with the aim of determining what other properties cluster amongst these phenomena. For the definitions of memory I have discussed, this set of phenomena includes those in humans and many of those in unconventional systems. Accounting for definitions provided by proponents in the unconventional cognition debate as hypotheses is thus useful because it provides a rigorous way of thinking about what cognition (or a specific cognitive activity) is without requiring a commitment that the given definition is correct (Colaço 2022b, 453).

In recent publications, the 'discoveries' that I addressed revolve around determining new similarities amongst a set of phenomena (2022a; 2022b). However, as is the case with any empirical hypothesis, these hypotheses can also play a role in orienting research to the discovery of phenomena that lie in the extension of these hypotheses. As hypotheses, these definitions can be used to make predictions about phenomena that fit their extension but have not yet been discovered. One can derive observable implications from these definitions that can orient and guide the discovery process.[5] Thus, once one thinks of definitions not as expressions but instead as hypotheses, these definitions can be employed in distinct ways that drive the search for phenomena in the definitions' extensions. While not all definitions will be suited to being hypotheses, the broad definitions provided by proponents have extensions that overlap with the extensions of conventional definitions. Thus, these hypotheses are not pursued simply because they are interesting, as this would result in MHC. Rather, we can assess these hypotheses via a shared body of 'data', which are the phenomena in the extensional space and the relations between them.

5 See Bich, Green 2018 for a related view.

Much as our accounts of human cognition are not settled affairs, we have likely not exhausted the discovery and characterization of interesting and appropriate cognitive phenomena in humans. One advantage to thinking of these broad definitions as generative hypotheses is that they apply to humans and unconventional cognitive systems in equal measure. By implication, these definitions can also orient research on the discovery and characterization of phenomena in humans, rather than simply accommodating known human cognitive phenomena. Thus, if one adopts an approach to conceptualizing cognition that is inclusive of all paradigmatic cognitive systems as well as the unconventional systems of focus in this debate, one can drive research on novel phenomena that are not exclusive to these unconventional systems. The approaches that I discussed in Section 2 can be productive for the study of human cognition, playing the same role across the gamut of systems to which these approaches apply.

The idea of searching for novel phenomena in humans via the generative guidance of alternative conceptualizations of cognition parallels the idea of accounting for human cognitive phenomena via the unificatory guidance of these approaches. It is admittedly more speculative – after all, it is unclear what researchers might find – but there is an opportunity for us to discover novel human psychological phenomena. Likewise, there are initial reports and proofs of concept of mammalian neuronal signaling phenomena that are in part informed by research stemming from the unconventional cognition debate. In memory science, for example, recent insights about a possible mechanism for the neural readout of a molecular engram (Mollon et al. 2023) builds upon the molecular model of memory that I discussed in Section 3. This research intersects with and supports the study of memory in single-celled organisms (Gershman et al. 2021; Gershman 2023). In this case, alternative approaches guide the search for these non-synaptic signaling phenomena in the human brain as well as in unconventional systems.

These cases show an upshot to pursuing a generativity avenue. Merely discovering and characterizing phenomena in unconventional cognitive systems is inadequate. New conceptualizations of cognition should also orient the discovery and characterization of human cognitive phenomena, just as they do for the phenomena that can be elicited from unconventional systems. This pursuit should be done in the endeavor to generate new research in these systems while simultaneously adding to the set of phenomena that are in the extension of terms and concepts of cognition across the board, blocking MHC in the process.

## 5 Conclusion

Should we apply cognitive kind terms and concepts to unconventional systems? In this paper, I have used the Mere Honorific Conclusion as a framing device for exploring the unconventional cognition debate. I argue that the unificatory and generativity avenues, when understood as applying to humans, offer a clear defense to the pursuit of cognition in unconventional systems and a block to this conclusion. Together, these avenues, already suggested in the literature, supply a strong case for the investigation of cognition in unconventional systems as a research program that can be evaluated in terms of new accounts for and new discoveries of cognitive phenomena, human and otherwise. Both avenues can block MHC by taking advantage of the set of phenomena in the overlapping extensional space of different cognitive kind terms and concepts in the debate. Accounting for and discovering new phenomena in this space allows for a way of challenging what cognition is while maintaining a connection to the phenomena that all in the debate aim to count as cognitive.

As a research program, this investigation is dependent on accounting for and discovering human phenomena. Even if proponents in this debate do not wish to take humans as exemplars of a cognitive system, they should not eschew human cognition in their investigations, as the research program depends on connecting insights on phenomena in unconventional systems to those in humans. Correspondingly, there is an empirical dimension to this research: should proponents be unable to substantiate these connections with their investigations, the research program will degenerate and ought to be reoriented or abandoned.

My arguments in this paper are not intended as a defense of the idea that unconventional systems like plants, single-celled organisms, or slime molds are cognitive. Rather, my claims are intended as an exploration of when proponents might be justified in investigating these systems and trying to connect these investigations with those of traditional cognitive science. Skeptics should acknowledge that these connections are possible, that our understanding of cognition likely can be revised based on new scientific research, and that the outcomes of this research might provide a defense for cognition in unconventional systems. At the same time, proponents should acknowledge that the outcomes of this research might ultimately provide a good reason to reject that these systems are cognitive. Such is the nature of a research program.

Acknowledgements

Thank you to two anonymous referees for feedback on an earlier draft of this paper. This research is supported by the Alexander von Humboldt Foundation.

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e-ISSN 2723-9640

**JoLMA**
Vol. 4 — Num. 2 — December 2023

# Cognition and Intelligence After the Post-Human Turn
## Insights from the Brain-Gut Axis

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**Abstract** This article discusses how the post-human turn in science and society is framing cognition, mind and intelligence taking as empirical case the gut-brain axis developed within microbiome science. The article brings into dialogue authors from different disciplines that deal with the relationship between cognition and posthumanism, with the aim to indicate posthumanism's potential but also to warn about the risk of its – more or less conscious – engulfment into a neoliberal framework. Bringing into dialogue an ontoepistemic and a sociopolitical analysis – debates that are too often kept separated – the article indicates that the 'becoming environmental' of cognition, mind and intelligence, far from simply being a dehumanizing gesture that causes anthropocentrism to crumble, is still a very human endeavour, deeply rooted in human history and its varied desires and political aspirations.

**Keywords** Cybernetics. Microbiome. Gut-brain axis. Computation. Posthumanism.



Edizioni Ca'Foscari

**Peer review**

Submitted 2023-11-02
Accepted 2023-12-21
Published 2024-02-07



**Citation** Raffaetà, R. (2023). "Cognition and Intelligence After the Post-Human Turn. Insights from the Brain-Gut Axis". *JoLMA*, 4(2), 179-200.

**DOI 10.30687/Jolma/2723-9640/2023/02/003**

## 1 Introduction

This article discusses how the post-human turn in science and society is framing cognition, mind and intelligence.[1] The aim of the article is not to analyse whether or not cognition is environmental, but rather to delineate the intellectual discourse that is starting to consider cognition as a more-than human issue. Neither does the article advance a normative argument, stating whether this transition is good or bad. My contribution is rather to problematize the issue; this critical cut is embedded in the way different authors have been chosen and juxtaposed. As an anthropologist (with a foundation in philosophy) who studies science and technology and its connection to the environmental crisis, in this article and for the sake of interdisciplinary dialogue, I embrace the idea that anthropology can be, in certain cases, akin to curatorial work (Sansi 2020). I have thus put into dialogue a number of themes and authors from different disciplines, with a bias towards the fields of science and technology studies and socio-cultural anthropology in which I situate myself. What unites the authors mobilized in this article is that they all deal with the relationship between cognition and posthumanism. While other authors in addition to those cited in this article could be recounted, my choice has been functional for my objective to trace a critical genealogy of the current post-human intellectual climate, in which both technoscience and social sciences and humanities participate (Pellizzoni 2015), and the way that it both reverberates into and originates from discourses around cognition and intelligence. This inquiry aims to indicate posthumanism's potential but also to warn about the risks its – more or less conscious – engulfment into a neoliberal framework.

As an anthropologist, I need an empirical locus from which to depart. This is the relatively recent technoscientific revolution in the study of microbes, tiny organisms not visible to the human naked eye, which connect humans with their environment. The current study of microbes relies on computational techniques and is very different from what it used to be a few years ago, when microbes could be seen and studied mostly as a result of laboratory cultivation that allowed the examination of microbes on a plate. A major limit to this technique lay in the fact that approximately 99% of the microbes populating the earth are not cultivatable in the laboratory – the so-called

This article is part of a project that has received funding from the European Union's Horizon 2020 Research and Innovation Programme (GA n. 949742 ERC-HealthXCross).

1 I use the term 'cognition' as the general framework of the special issue, the term 'intelligence' as linked to the reference, in the article, to computational cognition and artificial intelligence, and 'mind' because, as the article will show, its plays an important role in cybernetics and its popularization.

"great plate anomaly" (Robinson, Bohannan, Young 2010, 455). The need to cultivate a microbe in order to study it has been done away with by metagenomics. This is the study of microbial communities in their natural environment, based on the application of advanced DNA sequencing techniques to a microbial community's members. The results of sequencing are then analysed thanks to various informatics tools, some of which are also implemented with artificial intelligence and machine learning. Metagenomics defines the microbiome, that is, the ecological community of microbes that live in a given environmental sample. The concept of the microbiome is first of all the outcome of a technological revolution, part of a data-driven science that is changing all the sciences (Raffaetà 2022; Kotliar, Grosglik 2023).

Metagenomics has turned away from looking at one individual genome at a time by sequencing genome fragments, using computation to overlap these random segments and reconstituting them into larger continuities. Metagenomics departs profoundly from the methods of isolating individual microbes and culturing them, the mode of knowledge-making that dominated microbiology from the establishment, in the late nineteenth century, of the discipline in Koch's postulates and the very coining of the term 'microbe'. As Stengers observes (2020, 228), "The 'third-millennium microscope' has […] opened a window on a world of living beings that goes beyond this mode of intelligibility structured around the selection of individual genetic lineages". Perceiving the metagenome involves not just the fathoming of many additional kinds of bacteria that could not be cultured with conventional laboratory methods; it additionally brings both previously known and unknown individual entities into the frame of an interacting community. We have entered an era where health and biological functions are no longer the property of an organism but rather an emerging property of a network of connections between the human body and the environment, as well as within the human body, also called the "holobiont" (Formosinho, Bencard, Whiteley 2022). In this ecosystem of connections, microbes act as connectors between different organs and ecosystems.

From this ecological perspective, microbes relate to cognition and intelligence in several aspects. It is broadly recognized that microbes have an impact on the way the brain functions. The so-called gut-brain axis defines a series of studies that have confirmed an association between features of the gut microbiota and mental disorders, neurological diseases (Liang, Wu, Jin 2018) or cognitive impairments such as dementia (Daulatzai 2014) and autism (Pulikkan, Mazumder, Grace 2019). The gut microbiome is also correlated with major mood disorders such as depression, bipolar disorder and schizophrenia (Bioque et al. 2021), as well as cognitive performances such as learning and memory (Gareau 2014) and mental wellbeing in general (Yong 2016). These studies depict a 'second brain' in the gut, that

is, ecological and distributed, which somehow de-humanizes cognition. The thorny issue, however, is that so far, the correlation identified between the gut microbiome and cognitive functions says little about the mechanisms of their relationship and causative path (Mayer, Nance, Chen 2022). In other words, studies on the gut-brain axis are limited by the classical 'chicken or egg' problem. This, however, does not mitigate the scientific and popular interest and the hopes fuelled by thinking of cognition and mood as governed by our microbial fellows and thus more ecological.

Scientists, moreover, have moved beyond studying how microbes influence human brain, cognitive and emotional functions. Inspired by the symbiotic horizon opened up by the microbiome turn, they are exploring whether and how microbes themselves 'think' too. Microbes do not have brains, but they perceive stimuli, react to them and act accordingly, meaning that they have proto, ecological forms of cognition. In the 1990s, the microbiologist Pete Greenberg coined the term "quorum sensing"; this refers to an intercommunication system used by microbial populations, based on the exchange of biochemical signals between cells, to convey information needed for survival and regulate the genetic expression of various actions such as movement, cell transformations, DNA transfer and acquisition, and symbiotic interaction. The microbiologists with whom I speak in my fieldwork often refer to the way microbes 'think', somehow anthropomorphizing them, even if within an ecological, symbiotic framework.

How microbes 'think' – or how they influence human thinking – can offer glimpses into a mode of existence that displaces western and human ways of understanding and relating to the world. The microbial turn has inspired many leading scholars, from Donna Haraway to Tim Ingold, to think of symbiotic relations, as opposed to competitive relations, as the grounding of ontology and ethics (Hird 2009). Current studies also address how looking at microbes is emblematic of a more symmetrical and respectful relationship with non-humans and the environment (Brives, Rest, Sariola 2021). Yet the microbial turn, like every turn, is riddled with perils as well as promises (Paxson, Helmreich 2014; Lorimer 2020), especially considering that the microbiome is first of all a technological revolution. Before asking how microbes, brains and the environment are linked, it is therefore necessary to inquire into the intellectual genealogy of microbiome research.

## 2 Computation and Mind

### 2.1 Cybernetics and Counterculture

Microbiome science is first of all a computational endeavour that derives from the ashes of the Human Genome Project, a scientific enterprise that in the late 1990s promised to reveal the secrets of life by deciphering all of the genes in the human DNA. Kay (2000), tracing the history of that project, shows that molecular genetics was initially – and up to the 1940s – linked to biochemistry, aimed mainly at identifying the chemical nature of the organisational structure of cells and molecules. From around the 1950s, however, with the emergence of cybernetic communication theories and the advent of the computer, molecular biology became increasingly configured as a derivative of the mathematical theory of information, setting the seal – from the 1980s onwards – on the field's dependence on computers and sequencing technology. During this transition, microbiology also changed, becoming "a communication science, allied to cybernetics, information theory, and computers" (Kay 2000, 463).

Fred Turner, in his book *From Counterculture to Cyberculture* (2010), shows the connections between cybernetics, computer culture and broader transitions in North American society in the second half of the twentieth century. Turner's analysis is helpful for contextualizing the gut/brain axis hypothesis in computation's origin story. He illustrates how the mingling of bios and technology, along with the dawn of an environmental understanding of cognition characteristic of cybernetics, found its roots in the research laboratories of World War II and, later, in the massive military engineering projects of the Cold War. In 1942, the North American mathematician and philosopher Norbert Wiener – alongside his collaborators Julian Bigelow and Arturo Rosenblueth – began to think about how war system theory could be transferred to biology, in the belief that biological, mechanical and information systems could be considered as analogues of one another. This inquiry was not just technical, since information systems were also seen by these scientists as sources of moral good. The significant influence of cybernetics in many fields stemmed from the fact that it originated as an unprecedented mixture of various disciplines. As Turner observes (2010, 25),

> Wiener did not create the discipline of cybernetics out of thin air; rather, he pulled its analytical terms together by bridging multiple, if formerly segregated, scientific communities. Wiener borrowed the word homeostasis from the field of physiology and applied it to social systems; he picked up the word feedback from control engineering; and from the study of human behaviour, he drew the concepts of learning, memory, flexibility, and purpose.

> Wiener could assemble pieces from such diverse sources because he was in steady collaborative contact with representatives from each of these domains at the Rad Lab, in his famous hallway wanderings at MIT, and in his sojourns to the Harvard Medical School.

This creative mixing of disciplines created a system of interlegitimation that not only made it difficult for nonexperts to challenge the cybernetic rhetoric, but also placed into dialogue fields as different as computation, biology and neurology. This all-encompassing/homogenized discourse became easily popularized, well beyond the technical aspect.

Turner shows how the popularization of cybernetics took place in the encounter with the communitarian social vision of the counterculture of the 1960s and 1970s. This is key for the emergence of an environmental discourse about cognition, as counterculture was in some ways different from left-wing movements that aimed for social regeneration through the traditional techniques of agonistic politics such as manifestations, public consultations and strikes. The counterculture youth culture instead turned inward, towards the mind and consciousness, facilitated by a psychedelic mysticism. Marijuana, peyote LSD, rock music, strobe lights, light projectors, stereo speakers and the various delights of a technological consumer culture were ways to reach what was considered to be a genuine state of mind, one reconciled with the cosmic intelligence. The mind and the planet could finally mirror each other through mystical energies; these were considered to be the sources and content of all systems, being biological, social or technological.

The idea of an expanded consciousness and intelligence, however, was not seen as an end in itself – at least in the counterculture leaders' rhetoric. Rather, the mind was seen as the only conceivable means through which to build an alternative, egalitarian society. Counterculturalists were sceptical of traditional political activism; they distrusted politics, which were considered as part of the social and political ills of postwar US society. Hopes for a new world were glimpsed in a less violent, less rational and more psychologically authentic world. For the counterculturalists,

> the key to social change was not politics, but mind. In 1969 Theodore Roszak spoke for many when he argued that the central problem underlying the rationalized bureaucracy of the cold war was not political structure, but the 'myth of objective consciousness'. This state of mind, wrote Roszak, emerged among the experts who dominated rationalized organizations, and it was conducive to alienation, hierarchy, and a mechanistic view of social life. … Against this mode, Roszak and others proposed a return to transcendence and a simultaneous transformation of the individual self and its relations with others. (Turner 2010, 36)

Inspired by cybernetics, these young people saw the individual, and his or her transcendental mind, as a key element within a looping system of feedbacks, interconnected and somehow indistinguishable from society and the cosmos. The mind and consciousness were, therefore, celebrated as a system in their own right. Inspired by anthropologist Gregory Bateson, an active member of the cybernetic movement who considered that no one could live outside the system, counterculturalists concluded that it was also possible to save the system from within one's mind, in a deterritorialized and decentralized way that was however planetary in scope.

Turner observes that finding refuge in the mind, limited by its borders but unlimited in its potentiality, required counterculturalists to adhere to the imagery of the north American frontier, a new and vast space to be explored and colonized anew, from the inside of one's mind. With this frontier imagery, these youths also maintained its conservative gender, class and race system. Most counterculturalists were

> white, and most were under thirty years of age, well-educated, socially privileged, and financially stable… it was far more common for young, white, highly mobile hippies to find their interests in conflict with those of the comparatively impoverished and immobile populations of Hispanics and African Americans among whom they often settled. (Turner 2010, 77)

From the perspective of counterculturalists, class struggles had to be transcended in the name of the possibility of a regenerated humanity.

## 2.2 Artificial Life and Artificial Intelligence

From the 1980s, counterculturalists increasingly mingled with the computer programmers and techno-hippies of the Bay area. This meant that the counterculture's dreams did not vanish into history; instead, they were transfigured by an imagined community of linked minds into new language and tools, through new forms of computer-mediated and geographically distributed (potentially global in scale) sociability, in which bodies, the local dimension, material things and embodied participation in civic life increasingly lost their significance. Computation's main feature was to turn every procedure into a calculable process; therefore, the human mind and computation were conceptually conceived as united by their working through mathematical signs, indexed as universal.

The supposed universality of computation, mixed with the emerging environmental ethos of the times, informed new experiments in computation and biology. Anthropologist Stefan Helmreich (2000)

describes the emergence of Artificial Life (Alife) at the Santa Fe Institute for the Science of Complexity, an institute established in 1984 by a group of Los Alamos scientists, initially funded by Citibank/Citycorp with the aim to understand the world economy as a complex evolving system. Alife scientists created computer simulations as a way to create artificial worlds. In 1990, Tom Ray, one of the central figures in Santa Fe, created 'Tierra', a computer model of evolution, a "primordial information soup … a computational 'ecosystem' in which 'populations' of 'digital organisms' could 'evolve'…" (Helmreich 2000, 3). For Alife scientists, cognition – amplified by technology – could reach new horizons in newly created worlds, a "oneness with the computer, a oneness achieved when they had an immersed yet detached engagement with a simulation" (187).

Helmreich, however, shows that the mental oneness that scientists experienced was anything but transcendental. It was very terrestrial and of a specific kind. It was "infused with 'culture', or better, a particular culture" made up of ideals of liberal individualism, capitalism, competition and, again, the frontier imaginary of cyberspace as the Old West. As "life made by man rather than by nature" (Langton 1989, quoted in Helmreich 2000, 117), a creationist mythology also fuelled their visions, with scientists feeling like god-like, masculine procreators who could create their own worlds in a sort of immaculate – disembodied, rational and technological – conception. Helmreich describes Alife as a masculine experimental theology in which a universal and planetary-wide rationality could save humanity.

If we consider Turner's historical account and Helmreich's interpretation as sound, then military technoscience, neoliberal economic interests and political ambiguity, individualism, machismo and the frontier imaginary appear to be quite a likely origin story for the coupling between the mind, the environment and computers, and therefore also of the gut-brain axis hypothesis. However, in recent years, a number of authors – illustrated in the next section – have identified the capacity of computation to overcome human cognition, not just in quantity (number of cognitive processes performed in a unit of time) but also in quality (their kind). This would translate the values and ethics that embed computation into a completely different realm, a more-than-human plane of existence with unknown potential for emancipation from a too-human ethic.

## 3 Computers, Cognition and the Environment

To make their algorithms perform better, the Alife scientists nourished them with contingent elements from the outside world: not only laws taken from evolutionary theory (named 'genetic algorithms' and invented in the 1970s by the US computer scientist John Holland) but also their own values and cultural assumptions relating to gender roles, social hierarchies, desires, political visions etc. The so-called 'unconventional', 'natural' and 'non-classical' computing heuristics were developed to improve computer performance by integrating and in some ways mimicking biological processes. These included

> quantum, molecular, neural, cellular, DNA, and membrane computing; collective intelligence; parallel computation; cellular automata; chaos, dynamical evolutionary, and self-assembled systems; relativistic and collision-based computing; swarm intelligence; photonic logic; amorphous computing; physarum machines; and hypercomputers. (Fazi 2018, 147)

According to some philosophers, however, there is no need to outsource inputs from the outside world in such a way because computation already contains variation and contingency in its same computational formalism due to the infinity and incomputability of logico-mathematical entities. According to Beatrice Fazi (2018; 2019), computation possesses a mode of experience, even if it is not limited to the sensible input of an external empirical reality. Fazi's insight is based on Gödel and Turing's demonstration of incompleteness and incomputability. For both Gödel and Turing, the limits of mathematics were proof "that logico-mathematical reasoning cannot be contained within a finite formulation" (Fazi 2019, 117). This, far from being debilitating, marks mathematics as infinite and indeterminate in its potentiality; therefore, it is able to auto-ingress contingency and variation without the need to recur to external inputs. Fazi takes inspiration from Alfred North Whitehead's "radical empiricism" to ground her theory.

Both Gödel and Whitehead spoke of a rational but also intuitive capacity, more innate in some people than in others, to grasp logico-mathematical entities. Skilled mathematicians, indeed, usually have the capacity to 'feel' and 'see' mathematical entities and their relations in space. However, while for Gödel it is "something like a perception" (Fazi 2018, 120) and hence is still an anthropocentric and embodied intuition, for Whitehead this process – which he called "conceptual prehension" – is impersonal. This impersonal and non-human dimension is, for Whitehead, already empirical because mathematical entities are abstract and immanent at the same time. As such, "conceptual prehension" is not a flight of imagination into

a metaphysical dimension but instead extends empiricism to encompass the impersonal and purely rational experience of logico-mathematical entities.

For Whitehead, the assumption that there are some concrete entities separate from abstract entities neglects the fact that reality "is always already too real to be separated out into what is purely physical and what is instead mind-dependent, or into an opposition between a perceived and a perceiver. To be not realist enough means to make a separation between an objective and a subjective reality" (Fazi 2018, 169). For example, natural programming includes empirical phenomena (e.g. evolution laws) but takes these laws as a fact of life. This oversimplifies evolution laws, producing the fallacious[2] idea of an analogy between computation and biological laws.

Inspired by the radical empiricism of Whitehead, Fazi affirms that "computational emergence" (Fazi 2018, 162) exists. This refers to the creation of novelty even in the absence of environmental inputs. Computation, for Fazi, should be considered "an empirical phenomenon among empirical phenomena" (163). As she writes:

> computation is never really only a reduction and […] it never really only represents. Because of formal abstraction, computation is a procedure that is already complex – prior to any coupling with art, matter, or life – insofar as it is ingressed by a quantitative infinity that remains unrepresentable. (57)

The issue at stake for Fazi is not whether or not machines can reproduce human thought, but that computation can create a more-than-human novelty (Fazi 2019; see also Majaca, Parisi 2016). Therefore, the environment, the computer and human minds are in some way connected because they all participate in the same ontology in terms of cognition; Fazi terms this "Universal Computation" or "metacomputational view".

A similar, but slightly different, perspective is advanced by philosopher Yuk Hui, who identifies the emergence of novelty in the computational process of "recursivity" and not in the incomputability of logico-mathematical entities. Recursivity remains at the basis of cybernetics, artificial intelligence and machine learning. It is not

> mere mechanical repetition; it is characterized by the looping movement of returning to itself in order to determine itself, while every movement is open to contingency, which in turn determines

2 Whitehead took issue with the "fallacy of misplaced concreteness", which bases much of science on taking abstractions (e.g. the concepts of space and time) as concrete, external and given things.

> its singularity [...] Contrary to automation considered as a form of repetition, recursion is an automation that is considered to be a genesis of the algorithm's capacity for self-positing and self-realization. (Hui 2019, 4)

In his book *Recursivity and Contingency*, Hui traces the intellectual genealogy of a "general organology", a term first used by Georges Canguilhem in 1947 – a year before the publication of Wiener's Cybernetics – to rethink the relation between organism and machine. General organology does not simply assume an equivalence between humans and machines but considers the human-machine assemblage as an organic whole. Hui sees in the contemporary technological condition of artificial intelligence the possibility for a new form of philosophizing, referring to Heidegger's assertion that cybernetics is the end of metaphysics because it resolves the antinomies between mechanical laws and freedom, necessity and contingency, identity and movement, mechanism and vitalism. In a general organology for the twenty-first century, Hui sees the possibility to reconcile humans, minds, environments and machines due to the recursive action of artificial intelligence and machine learning.

To complement these views addressing the self-sufficiency of either the logico-mathematical entities or the process of recursivity, I find it appropriate to juxtapose the reflections of Giuseppe Longo, a mathematician and epistemologist, who brings us back from the plane of abstract immanence to the human ground. Longo (2021) has long theorized that the development of mathematics is essentially grounded in the human experience of being in a world in action, in space and in time. Mathematics, for Longo, is a way of knowing that is "built in the world, to organize and understand the world"[3] (Longo 2010, 16) and therefore is rich in intersubjectivity and history. For Longo, mathematical intuition – as evoked by Gödel and Whitehead – is not impersonal but subjective, intersubjective and aimed at coordinating humans in the environment in which they live. Mathematics is

> rich in meaning, of ordering, of writing, of the iterated movement towards the horizon; the sense of the discrete flow of time. Origin of human, and pre-human as regards small numbers (Dehaene 1997), practices of putting together countable quantities. A meaning rooted in ancient gestures and [...] in a plurality of practices.[4] (Longo 2010, 30)

**3** The English translations are by the Author. "Costruito nel mondo, per organizzare e capire il mondo".

**4** "[R]icco di significato, dell'ordinare, dello scrivere, del movimento iterato vere so l'orizzonte; il senso del fluire discreto del tempo. Origine delle pratiche umane, e

Giuseppe and Sara Longo propose that "from Artificial Intelligence to the biology of the program and of genetic information, we must regain the sense of the body, its space and its radical biological materiality"[5] (2022, 2) because mathematics derives from the human capacity and need for movement and orientation. As such, they seem to suggest that the *a priori* of reality cannot be identified solely in the infinity of mathematical entities or the recursivity of computers but also in the "presence of the biological body in an ecosystem, with its links and interactions with everything that is within this ecosystem, starting from the co-construction of its biological 'niche', its own space"[6] (26). If we contextualize this quote in the empirical case from which this article has departed, it implies that the microbial ecosystem, and its connection to cognition, cannot rely on computational representations alone; it is also created by concrete organisms and their relationship within an environment. This grounding should be taken seriously, embracing consequences that go beyond the biological.

Because grounding mathematics and computation in a human and biological realm, it brings back the issue of human ethics and politics. This has been more fully developed by Alessandro Sarti, a mathematician and Longo's collaborator. He speaks of "heterogenesis" or "morphogenesis" to address how biological, material entities generate emergence and novelty (Sarti, Montanari, Galofaro 2015). For Sarti, heterogenesis includes historical and social dimensions; he calls for the need to integrate "every type of informational objectification with vital, affective and social systems"[7] and "immerse them in historicity"[8] (Pelgreffi, Sarti 2018). In his view,

> mathematics is knowledge among knowledge, and it makes sense if it is put in relation with these other knowledges […] Mathematics, which is a beautiful, generous, imaginative science etc… but it must be thought as one among the other languages, among the other five languages, and anthropology among these is one of my favourite languages.[9] (Personal communication)

pre-umane per quanto riguarda i piccoli numeri (Dehaene 1997), del mettere insieme quantità numerabili. Senso radicato in gesti antichissimi e […] in una pluralità di pratiche".

5 "[D]all'Intelligenza Artificiale alla biologia del programma e dell'informazione gee netica, bisogna riconquistare il senso del corpo, del suo spazio e della sua radicale materialità biologica".

6 "[L]a presenza del corpo biologico in un ecosistema, con i suoi legami e le sue intere azioni con tutto ciò che vi è all'interno di questo ecosistema, a partire dalla cocostruzione della sua "nicchia" biologica, del suo spazio proprio".

7 "[O]gni tipo di oggettivazione informazionale con i sistemi vitali, affettivi, sociali".

8 "[I]mmergerli in una storicità".

9 "[L]a matematica è un sapere tra i saperi e ha senso se viene messa in relazione con questi altri saperi. […] La matematica, che è una scienza bellissima generosissima

Authors such as Matteo Pasquinelli (2023) and Tiziana Terranova (2004) have illustrated the emergence of artificial intelligence and computation as entangled within specific social and political configurations. Fazi, too, in advancing an aesthetic of computation as a provocation against cognitivism, admits that this aesthetic is "a cold world, in which there are no people" and that it will be necessary, in future work, to complement her insights with cultural and sociopolitical ideas. It is in this direction that we are turning now.

## 4 Stepping Outside of an Ecology of Mind

In the previous three sections I have shown the technosocial forces that, in the West, have inspired scientists and communities to think of cognition as something not exclusively human but instead distributed throughout the environment. I have also discussed how this has inspired two different approaches, as well as their degrees of variation: one is to consider the environment as an empirical resource to be integrated into computation in order to nourish rationality with contingency and variation; the other finds these already situated within rational reasoning and algorithmic functioning. In other words, the first approach proposes stepping outside the human mind and making it environmental; the other is content to stay within human or computer cognition because it is already contingent and universal at the same time. This is certainly a fascinating debate; both displace cognitivism, though with different arguments. However, is there another way to make sense of cognition? If we step outside of the mind as simply an ontoepistemic[10] object and start to consider it as a historical and political object, we may encounter even more compelling issues.

Social theorist and artist Denise Ferreira da Silva has described Western philosophical thought as a rising attempt to externalize the internal human mind into the external reality. This approach grounds a science that relies on the very possibility of engaging exterior things; this is because the possibility of knowing with certainty is achieved by establishing "that the mind has access to, relates to, and is affected by things other than itself, that is, exterior things" (2007, 31). In other words, "without the idea of exterior things, the mind's distinguishing attribute, interiority, cannot be articulated" (44). Yet, according to Ferreira da Silva, this process of externalization obliterates external things at the same time by engulfing them

fantasiosa eccetera… ma deve essere pensata tra gli altri linguaggi, tra gli altri cinque linguaggi, e l'antropologia tra questi è uno dei miei linguaggi preferiti".

**10** For an illustration of how the ontological and the epistemic dimensions cannot be considered as separate, see Barad 2007.

in the internal illusion of a universal and abstract mind. This observation has become particularly salient since Ferreira da Silva has included races and human difference in the Western cognitive engulfment of "exteriority", showing that the expanding Western mind engorges not simply nature, but also culture, and also illustrating how this ontoepistemic move is linked to a political one.

Anthropologist Elizabeth Povinelli makes this clear by critically considering the work of Gregory Bateson, an anthropologist who engaged in and inspired cybernetics. In his seminal work, *Steps to an Ecology of Mind* (1972), Bateson intervened in the dialectic between life and computers and showed their continuity across cognition, in a very similar way to that of Canguilhem and his general organology:

> Let us consider for a moment the question of whether a computer thinks. I would state that it does not. What 'thinks' and engages in 'trial and error' is the man [*sic*] plus the computer plus the environment. And the lines between man, computer, and environment are purely artificial, fictitious lines. They are lines across the pathways along which information or difference is transmitted. They are not boundaries of the thinking system. What thinks is the total system which engages in trial and error, which is man plus environment. (Bateson 1972 quoted in Povinelli 2021, 107)

Cognition, for Bateson, was all-encompassing and emplaced, able to disrupt the boundaries between the human, the computer and the environment; this was so very different from the usual understanding of cognition as something merely associated with the brain. Bateson's distributed cognition has inspired a great number of disciplines and intellectuals and has been important in challenging anthropocentrism's certainties.

Povinelli, however, brings our attention to the fact that in Bateson's theory of mind, anthropocentrism was only dismantled at a surface level. In reality, it has remained intact and untouched as a political and epistemological locus. The key innovation that allowed Bateson to link humans and computers through *cogito* was the consideration of thinking as an environmental, distributed process. However, in his formulation, it was not the thinking that was influenced and modified by the environment but vice versa: for Povinelli, the Batesonian mind assimilates difference in order to celebrate itself. While advocating for the continuum of mind-environment-computers, Bateson also "insists that without a human mind, objects like telescopes, windup toys, computer software, rocks, winds, and corpses are without mind" (Povinelli 2021, 110). This leads Povinelli to assert that "Bateson is not merely examining how minds engorge difference in order to expand their territory; he is also excluding entire regions of existence from mental motion" (110). Povinelli sees in Bateson the apex of

what many consider anthropology's original sin, that of incorporating otherness to serve the West's own interests:

> As he carefully opened his mouth to incorporate the differences of others, he slowly shaped them into a new metapattern of mind. The more he pulled difference into himself, the more he claimed to be able to abduct the larger metapattern of existence, a wondrous kaleidoscope of aesthetic patterning. (109)

According to Povinelli, "Bateson and a host of new ecologists were building a model of a mind that absorbed others in order to expand mind from the human to the biosphere" (108).

This may seem to be a confirmation of Turner and Helmreich's critiques of cybernetics and system biology. However, Povinelli takes Bateson not only as a figure (in the Foucauldian term) of post-war social and scientific movements, but also as a precursor of the ontological turn, new materialism and posthumanism, intellectual strands that pervade contemporary life and social sciences and humanities. In her book *Between Gaia and Ground*, she analyses these approaches, which – despite their differences – exhibit a common thread, that of imagining "a form of political solidarity grounded in the entangled nature of human and more-than-human existence" (2021, 16). The limiting factor of this attempt, according to Povinelli, is that it starts with an ontological rather than a political and historical preoccupation. In the name of battling against the reductionistic view of 'humans' as different and separate from 'nature', this scholarship considers humans and non-humans as entangled by advancing an ontological claim as a necessary first step to clear the ground and only subsequently proceeding towards a political evaluation of the implications of this consideration.

This methodological primacy of ontology *vs* politics, according to Povinelli, is the rhetorical tool through which Western social theory attempts to imagine a new start. The trick is to posit an ecological ontological foundation *vs* a human foundation, a blank slate that promises to cancel the planetary damage that has been provoked by the Western colonial history of dispossession and exploitation. This, for Povinelli, is a move into innocence with the illusion that "by returning to a set of first conditions – to ontology" (2021, 16), it may be possible to solve the environmental and social problems that afflict humanity today. While I was participating in a series of lectures on climate change at Prada Foundation in Venice in October 2023, the curator of the associated exhibit, Dieter Roelstraete, explained his obsession with genealogies and dates as due to an ardent wish to be able to go back, imaginatively, to the very day before the Anthropocene started. This, he said, would offer the opportunity to choose a different path for humanity. Very composedly, Leslie Lokko – curator

of the 2023 Venice Architecture Biennale – made the observation that, while this may be a nice idea from Roelstraete's perspective, there are people who do not even know their history. This is because some people can no longer claim or remember to have had a history because it has been destroyed, forbidden and cancelled by Western colonization and its many waves. In other words, to solve the oncoming catastrophe for humanity, it is not enough simply to go back in time. Even if we have goodwill and the sins of our ancestors were not our choice, we are condemned to take responsibility for their consequences: to face the present conditions heavy and full of all the injustices and violence of what has been stratified on the planet before us and try to remediate it in the present from our specific positionality.

I find Povinelli's critique a healthy intervention – if radical at times. She urges us to give priority to the violent, not the ontological, history of colonial racism; to clear the ground, because the first condition is a racial and colonial, not an ontological condition. She invites us to think of the treatment of people – of specific people – instead of abstract minds, even if environmentally twisted. She is sceptical of any general theory of human and nonhuman existence that does not start by asking about the colonial and racial condition, or avoids it:

> every theory of existence – whether positing an ontological entanglement of existence or some form of ontological object (hyper-, hypo-, or micro-) – must begin with and have as its ultimate goal the dismantling of this rolling ancestral catastrophe [*of colonialism and social injustice*]. Any discussion that shifts attention from the uneven social and physical terrain of the ongoingness of this catastrophe or begins with a general theory of the human and nonhuman world contributes to the reinforcement of late liberal capitalism's disavowal of its toxic machinery. (2021, X)

In other words, if we adhere to Povinelli's suggestion, the first question to be posed is not whether minds, bodies, environments and machines are interrelated. Surely they are, and there are different ways of conceptualizing these relations. Rather, the issue to be explored is the question of for whom and for what these relations are activated.

Who gains in the 'becoming environmental' of the mind? What are its outcomes in our human world? The 'becoming environmental' of cognition and all the desires, visions and aspirations that accompany it should be analysed not in abstract but as an ontoepistemological turn that takes place away from a social-political structure that enframes it and produces the contours of its capacity to act in the world. Anthropologist Sarah Franklin (1995) has observed that science's focus has shifted in the last century from understanding facts about nature to understanding the 'secret' of life and its building blocks, mainly for biotechnological exploitation. It is out of the

scope of this article to delve into the political economy of minds and brains becoming environmental or into the industry interests in microbiome research (van Wichelen 2023; Widmer 2021) and microbial cognition that rest on growing bioeconomy interests based on "biovalue" (Waldby 2002) or "biocapital" (Sunder Rajan 2006). This is a very complex issue, as the depiction of scientists as tough capitalists does not do justice to the important role played, for many of them, by genuine scientific interest or progressive political aspirations. Yet the increasing assetization of nature (Beltrame, Hauskeller 2018; Birch, Muniesa 2020; Pinel 2021) and its connection with neoliberal academia and the research-industry nexus is something that should be considered when assessing the 'becoming environmental' of cognition.

## 5 Conclusion

This article has taken inspiration from the study of the gut-brain axis and the new science of the microbiome to analyse the 'becoming environmental' of cognition, mind and intelligence in contemporary life and social sciences and humanities scholarship. Retracing the technoscientific nature of the microbiome, which connects minds, bodies, environments, microbes and machines through technology and computation, led me to a critical analysis of its legacy, which dates back to postwar cybernetics and its development into system biology and, more recently, artificial intelligence. The article analyses how various authors have positioned themselves in this debate, depicting a spectrum of approaches that has ranges from one pole that considers cognition to be outside minds and computers to another that identifies the source of cognition as inside computation and minds. By juxtaposing critical and analytical approaches, I argue that an ontoepistemic assessment of cognition becoming environmental cannot be disentangled from sociopolitical and historical considerations. An explanation of cognition cannot be given in abstract and universality; it is a specific output of the Western scientific debate and its encounter with the radical other, being human or more-than-human, and of what we decide to do with this alterity. Cognition is thus the outcome of a dialectic between ontoepistemological claims and historical conditions.

The article's aim has been to offer a critical problematization of the 'becoming environmental' of cognition and mind. Here, I use the term 'problematization' following Foucault; it is taken as a methodological category, the goal of which is not to make any claim about what the topic at hand really is or what can really be known about it. To dwell on problematization is not a problem-solving endeavour; rather, it contributes to tracing the conditions of possibility for the present, as well as possible alternatives. Such an analysis needs to be developed in light of the historically constituted, heterogenous

and partially overlapping events and fields that have made it possible. Problematizing is a critical, immanent and experimental conduct with no normative aspirations (Koopman 2013). It is an unbounded, never finished, yet generative undertaking. In this article, I have tried to do this by bringing into dialogue an ontoepistemic and a sociopolitical analysis, debates that are too often kept separated.

This allows me, in this last paragraph, to refer back to the title of this special issue: "De-humanizing Cognition, Intelligence, and Agency". With the concept of 'de-humanization', the editors asked authors to reflect on the concepts of cognition, intelligence and agency in their shift in perspective: from almost exclusively human capacities, which eventually extended into the environment by humanizing non-human spaces, to a post-human, post-anthropocentric posture that takes non-humans as the resource and origin for human cognition. In problematizing the mechanic of this inversed movement (from humans to the environment before, from the environment to humans now), defined by the editors as a process of de-humanization of cognition, I conclude by affirming that the 'becoming environmental' of cognition and intelligence, far from being simply a de-humanizing gesture, is still a very human endeavour, deeply rooted in human history and its varied desires and political aspirations.

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e-ISSN 2723-9640

**JoLMA**
Vol. 4 — Num. 2 — December 2023

# Multispecies Justice and Human Inequalities: Risks in Theorizing Anti-Anthropocentric Politics

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**Abstract** Human status categories have ceased to be the ontological prerogative of humans alone, and this paradigm shift carries broad ethical implications. In this essay, we investigate the concept of multispecies justice (MSJ), as it seeks to overcome the humanistic-liberal construct of justice, without sliding back into an anthropomorphisation of the nonhuman. We engage with the political limits of MSJ, as it fails to grasp a critical-genetic discourse on the historical materiality of inequalities. We advance the urgency for a more politically engaged posthumanism, as it runs the risk of becoming completely detached from current social struggles.

**Keywords** Posthuman. Multispecies justice. Climate justice. New materialism. Social struggles.



Edizioni Ca'Foscari

**Peer review**

Submitted 2023-09-30
Accepted 2023-11-19
Published 2023-12-20

**Open access**



**Citation** Terragni, C.; Cesaroni, V. (2023). "Multispecies Justice and Human Inequalities: Risks in Theorizing Anti-anthropocentric Politics". *JoLMA*, 4(2), 201-220.

**DOI 10.30687/Jolma/2723-9640/2023/02/004**

## 1 Introduction

More than two decades have passed since what many consider the foundational act of Climate Justice movements. In 2000, the first climate justice summit took place at the Hague, organized by the Rising Tide network as a radical alternative to the Cop 6 – the sixth session of the United Nations Framework Convention on Climate Change conference. In the following years, the Bali Principles of Climate Justice were written (2002), the Burban Group for Climate Justice was founded (2004), and the Climate Justice Now! global coalition was formed (2007) (Tschakert et al. 2020). Today, climate movements that advocate climate justice as one of their core principles are well known and widespread, such as Fridays for Future, Extinction Rebellion, or Last Generation.

Meanwhile, posthuman research has been facing the climate crisis by challenging human-nonhuman, nature-culture, and person-environment separateness. The wide and multidisciplinary arena of posthumanism has been proving how people and things (may these be plants, animals, rocks, computers, microbes, or else) intersect, reverse, and co-implicate each other. In general, two different ways in which this division has been challenged may be identified. On the one hand, there is a growing number of inquiries that bring to light the hybrid nature of both the subject and his social systems. For example, the philosophical reflections on technologies, biotechnologies, and social robotics (e.g. Hayles 1999; Gunkel 2012; Haraway 2022), as well as the ontological turn in anthropology (e.g. Viveiros de Castro 2014; de la Cadena 2015; Kohn 2021) are interesting examples of the study of the more-than-human social assemblages that challenge *anthropos*' uniqueness and independence. On the other hand, instead of deconstructing human exceptionalism, some theoretical movements are experimenting with ways to make other-than-humans' faculties emerge. For example, anthropological multispecies ethnographies (e.g. Kirksey, Helmreich 2010; Tsing 2014) or new materialism theories (e.g. Bennett 2010; Coole, Frost 2010; Gamble et al. 2019) advance a redefinition of agency, thought, speech, emotions, sociality, which cease to be an exclusively human and intentional prerogative.

One of the most recent spaces of interaction of climate justice discourse and posthuman theories is the emerging field of Multispecies Justice (MSJ), which aims at exploring the implications of the dehumanization of traditionally human characters by considering its ethical and political consequences (Celermajer et al. 2020 and 2021; Tschakert 2020; Tschakert et al. 2020; Fitz-Henry 2021; Thaler 2021; Verlie 2021). In this essay, we engage with the concept of MSJ and scan the horizon of possibilities opened by the radical change of the subject of justice this scholarship advances. In fact, investigating the

moral obligations to nonhumans, MSJ attempts to overcome the dominant humanistic-liberal notion of justice through the recognition of a relational subject of right. Aware of the risk of falling back into anthropocentrism, we join MSJ in suggesting switching the question from the ontological level of entities to a relational one; this change helps to avoid the ontological move of anthropomorphizing the nonhuman as a way out of the anthropocentric paradigm, a move that, in fact, reconfirms it. Nevertheless, we are critical of some ethical-political aspects of MSJ, that we articulate in two directions. First, new materialist theories on which MSJ is rooted develop the notion of multispecies relationality in a not historically enough manner. This lack recreates the pattern of a different metaphysics, failing to address the materiality of inequalities from a critical and genetic point of view. Second, the MSJ's theoretical perspective seems to be hardly operable in the current concrete institutional world. It reveals a detachment from reality that risks falling into a sterile idealization. Despite revealing an awareness of the (mainly white) privileged position of academic discourse, MSJ deficits a practical grasp on human injustice. Debates around MSJ, and posthumanism in general, run the risk of becoming an abstract environmental concern, permanently disengaged from historical and current human intra-species inequalities and social struggles.

In order to grasp the dangers inherent in theorizing an anti-anthropocentric politic, the article starts with a brief overview of the limits of justice and climate justice thought. From these weaknesses the idea of MSJ has been articulated, of which we outline the focal points and theoretical basis. In the subsequent section, we highlight the theoretical and political shortcomings of this construct, as it has been developed so far. Finally, we share the perplexities about the feasibility of realizing this type of justice, concluding with a broader (self) reflection on the possibility of posthumanist academic work's engagement with social struggles.

## 2 Multispecies Justice As Ethical Alternative

### 2.1 Critics to (Climate) Justice

The concept of Climate Justice has been discussed, expanded, and deepened both in academia and policy arenas. Yet climate change remains one of the most urgent issues humanity must face, and climate injustice continues to be one of the preconditions of local and global power relations. The normative frame of climate justice does not seem to be suitable to address today's socio-environmental crisis. According to Tschakert and colleagues, this is for two reasons:

> [F]irst, as a framing for the problem, climate justice is insufficient to overcome the persistent silencing of voices belonging to multiple "others"; and second, it often does not question – and thus implicitly condones – human exceptionalism and the violence it enacts, historically and in this era called the Anthropocene. (Tschakert et al. 2020, 2)

One of the limits of climate justice theory is its anthropocentric basis. This doesn't only neglect a wide range of other-than-human entities, but it also fails to embrace posthumanist critiques. We explore the recent studies on Multispecies Justice, a growing body of research trying to overcome climate justice's anthropocentrism and liberal-humanist basis. Starting from the critics it moves to the traditional idea of justice, we will then engage with the new subject of justice it advances and investigate the risks involved in this theory.

Multispecies justice rejects the longstanding misconceptions on which climate justice theory is based. Despite its vocation for inclusiveness, most climate justice is rooted in Western theory of justice, which is historically founded on a liberal-humanist ontology (Grear 2015). As Verlie brilliantly summarizes:

> The *liberalism* is a belief that the world is primarily composed of rational individuals: discrete entities that can enter into relatively shallow relationships ('connections') with the rest of the world (Barad 2007), but that always do – or should be entitled to – retain their own integrity, sovereignty and independence [...] The *humanism* is the belief that humans are the only subjects in the world. Humans are considered the only beings able to exert agency, intentionality, or choice and the only ones deserving of moral, ethical, political or legal consideration. (Verlie 2021, 3)

This leads to a liberal individualistic and anthropocentric notion of justice. In other words, justice – climate justice included – is based on at least two false assumptions. On one side, there's the liberal idea of humans as singular, independent, insulatable individuals. When applied to climate justice, the ontology of body separation produces clearly distinct parties, and this usually takes the shape of a conflict between a polluter and a victim. On the other hand, climate justice is based on humanism, which has been tinged with an anthropocentric character for centuries. It can be resumed in three interrelated ideas: a) humans are distinct from other species and inorganic natural and technological world; b) human mind, consciousness, reason, agency are special qualities that render them unique compared to other Earth entities; c) humans are the most valuable species and thus merit greater moral consideration (Celermajer et al. 2021; Thaler 2021). The exceptionalism of this kind of *anthropos* renders our species worthy of

a different moral regime compared to the ethical consideration dedicated to nonhumans. The universalized and homogenized category of human has been excluding – and often still does – all the subjectivities that do not correspond to the quintessential white, privileged, able-bodied, heterosexual man. Feminism and ecofeminism have illuminated how the Western ontology that organizes the world through the lens of rigid oppositions is the foundational source of inegalitarian hierarchies and structural violences (e.g. Plumwood 2002). Motivated by gender, queer, postcolonial, Black, and Indigenous studies, the promoters of MSJ complicate the ethics on which justice practice is based, as avoiding confronting intersectional power inequalities, and blurring specific positionalities in the economic, socio-political, gender, and cultural structures, has lead to a kind of difference-blind unfair justice. In this regard, an equivalence between intra-humans power differences and human-nonhuman inequalities can be traced.

To summarize, MSJ research aims at overcoming liberal individualist and anthropocentric notions of justice, mainly through a radical change of the subject of justice, overcoming "the individual and exceptional human being" in order to reach the range of "living and non-living entities, and their interactions and processes" (Tschakert et al. 2020, 5). As we are going to elaborate in the next paragraph, MSJ does not only seek to include a wider number of entities in the arena of justice, but to challenge the traditional individual person as the only possible subject of justice.

## 2.2 A Multispecies Subject of Justice

The 2019-20 Australian bushfire season has earned the harrowing title of Black Summer. The wildfires destroyed more than 10 million hectares of land and killed or displaced an estimated three billion animal lives (WWF-Australia 2020). Experiencing this ecological, human-driven catastrophe, has led many researchers to reflect on multispecies violence and rights. At Sydney University, the Multispecies Justice project,[1] led by David Schlosberg and Danielle Celermajer, has become one of the main promoters of research devoted to

> rethink what it means to be in ethical relationships with beings other than humans and what justice requires, in ways that mark these deaths as absolute wrongs that obligate us to act, and not simply as unfortunate tragedies that leave us bereft. (Celermajer et al. 2020, 475)

1 https://www.sydney.edu.au/sydney-environment-institute/our-research/environmental-justices/concepts-of-practice-and-multispecies-justice.html.

As regards the politically involved scholarship underlying MSJ, Celermajer and colleagues (2021) dispose of four intersecting arenas in which MSJ finds its roots. These include animal rights theories; environmental justice and political ecology; posthumanism, in particular the Actor-Network-Theory (Latour 2005; Law 1992), multispecies ethnography, and new materialism; Indigenous philosophy and decolonizing justice theories, with their critique of posthumanism (e.g. Hoogeven 2016). One of the main common aspects of these branches of knowledge is precisely the deconstruction of human superiority, the de-humanization of traditionally human characters, and the experimentation with other-than-human faculties. MSJ engages with the ethical consequences of this paradigmatic shift, enquiring who or what is worthy to be included in the moral arena.

We think it's important to emphasize that a multispecies approach to justice doesn't simply mean including nonhumans in the same human justice structure. It's not as easy as transporting the historically rooted ethic-political organization to nonhumans, as it would imply anthropomorphising them once again. We believe that dismantling human exceptionalism doesn't lead to the conclusion that we are all the same. Failing to recognize that other-than-human species have different (in)organic life experiences, different bodily mechanisms, and different intra- and inter- species organizations would just be extremely naive. This is actually a kind of moral anthropomorphisation that is not so uncommon in the case of invasive species for example, when the nonhuman "invader" is blamed and convicted of the ecosystem imbalance. Indeed, without an accurate analysis of historical and contingent power dynamics, we are left with a quite ingenious interpretation. It's by focusing on complex environmental relations, ecosystem unbalancing, and damaging that one can trace a path for processes of accountability. It's common practice to omit the more-than-human hierarchies of power that have historically led to specific kinds of economic and environmental vulnerabilities. This fails both in making different responsibilities emerge, and in connecting power positions to culpability. What is needed instead, is an account for other beings, in respect of their specific and immeasurably different life experience, capacity, embodied abilities, ways of existing, functioning, and interacting.

One of the tasks of MSJ is precisely accounting for nonhuman diversity through a change in the justice system, because of a change of justice subjects. No subject is an independent individual. Every entity is the material product of always-in-flux interactions and processes. What is "to be" always has to be-with. According to Tschakert, MSJ aspiration is

> to acknowledge the many Others with whom our respective lives are intertwined, tangibly, knowingly, or otherwise, confront the inseparability of our shared vulnerabilities and suffering in today's

> interrelated crises, […] how do we, in practice, instigate and nourish such engagements with these Others? (Tschakert 2020, 3)

Western climate justice scholarship and movements often keep on obliterating the universal connectedness, the entangled (Barad 2007) dimension of existence, the multispecies assemblages (Tsing 2015) in which we live, the geosocial character of life (Palsson, Swanson 2016), the becoming-with (Haraway 2008) of every sort of variation. Theoretically, MSJ commits to embracing this assumption, replacing the liberal-humanistic paradigm with a relational materialistic one. The ideas of relationality and material agency contrast the assumption of fixed, determined, and autonomous beings, in favor of "shifting, distributed, interdependent and heterogeneous" subjectivities, as they are always "composed, decomposed and recomposed through ever-changing more-than-human relations" (Verlie 2021, 4).

Once the fiction of individuality is revealed, the only possible move for rethinking the subject of justice is toward the array of "companion species" relationships (Haraway 2008) that render each other capable of existing. Therefore, there cannot be a just outcome for one if there is no justice for all. Relying again on Celermajer's work:

> Multispecies justice redesigns justice away from the fiction of individualist primacy, toward an ecological reality where humans actually exist: in a larger set of material relationships. Here, human and nonhuman animals, species, microbiomes, ecosystems, oceans, and rivers – and the relations among and across them – are all subjects of justice. Consequently, multispecies *in*justice comprises all the human interruptions of the functioning of this broad array of relations. (Celermajer et al. 2021, 127)

The subject of justice advanced by MSJ decenters the singularities in order to focus on relationalities, cross-scalar interconnections, and lively networks of more-than-organic socialites. The kind of morality that guides the aspirated configuration of the justice system is an "environmental ethic based on ecocentrism, deep ecology, and animal rights/liberation" (Thaler 2021, 3). MSJ scholarship adopts the care ethic promoted by ecofeminism, which rejects the hierarchical oppositions that render the (nonhuman) other distant, unknown, and inferior. Fisher and Tronto define care as an "activity that includes everything that we do to maintain, continue, and repair our 'world' so that we can live in it as well as possible" (Fisher, Tronto 1991, 40).

Especially in the climate change era, there's no care without multispecies and more-than-organic care. Caring for humans means establishing a kind of relationship with the nonhuman network that allows communities interagentive living. Talking about Indigenous Marind groups of Indonesian West Papua, Sophi Chao defines multispecies

care as "the *relations* that shape the affective and moral textures" of more-than-human shared lives and deaths (2021).[2]

In order to render MSJ operative, Tschakert et al. (2020) delineate four orientation points aimed at changing the justice approach. These are: a) intersectionality, which recognizes different inequalities of race, class, gender, age, ability, species and their interweaving in structural processes of oppression; b) inclusiveness, which assumes an entangled and flat ontology and consequently the interdependence of all entities; c) response-ability in a more-than-human world (Haraway 2016), which means learning how to nurture supportive relations with our companion species in everyday practices of production, consumption, and reproduction; d) cosmopolitics (Stengers 2005, 2010; Latour 2005; Sheikh 2019), which is a type of politic that points to comprehend "diverse experiences, emotions, practices, and perspectives, and embraces both deliberation and disruption" (Tschakert et al. 2020, 7), finally overcoming technocratic useless solutions. In the next paragraph we are going to focus in particular on the second point, moving some critiques to the ontological grounding of some new materialist theories.

## 3 Politics of Entanglement

As seen so far, MSJ has developed in opposition to both the anthropocentric paradigms of justice and the theories of climate justice. The last ones are ultimately based on a logic of extending human properties to nonhumans, failing in their aspired deconstruction of the anthropocentric paradigm. In fact, instead of attacking the heart of the problem (which is the idea of an individuated and identifiable subject, considered exceptional with respect to what is considered nonhuman or not properly human) they only widen its scope. By stigmatizing both positions, MSJ aims to directly challenge the classificatory (therefore exclusionary) attitude of anthropocentric theories of justice.

Articulating around the theoretical legacy of posthuman and new materialist theories (Barad 2007, Bennett 2010) with a particular reference to the theory of "entanglement" (Barad 2007) and "flat ontology" (Latour 2005; Bryant 2011), MSJ advances a new subject of justice: instead of an ontology of being, it replaces an ontology of relations. Thus, the main characteristic of multispecies justice's approach lies in positing relationality as the subject of an ethical-political

2 We hope the extreme simplification of the immense ecofeminist work we are offering here can be forgiven. We invite the reader to take the few references as mere hints, which we have no opportunity to elaborate on in this context. For a brilliant in-depth analysis of multispecies care we strongly advise "Multispecies Care in the Sixth Extinction" (Münster et al. 2021).

perspective that aspires to reshape ethical-political paradigms to be inclusive of the nonhuman.

Although we believe that the effort to deconstruct the liberal subject of justice is crucial, we nonetheless feel that this attempt made by the MSJ is not sufficient. This is due to the theoretical legacy on which it is articulated, namely that of new materialism. From an ethical-political point of view, we notice that concepts like matter, relationship and distributed political agency are problematically left without a socio-historical definition. Indeed, we believe that this can lead on the one hand to a concealment of certain power dynamics and oppression, and on the other hand to a political indistinction of the role – and thus the liability – of the actors. For reasons of space, we will limit ourselves to critical remarks on a few points common to all orientations of new materialism.

Common to new materialist theories, although internally differentiated, is that of redefining the relationship between the human and the nonhuman by proposing a vision of matter that is no longer inert and passive but active and "vibrant" (Bennett 2010), such that the relationships between humans and nonhumans are "entangled" (Barad 2007). Although we consider it important to proceed in a deconstructive sense with respect to the anthropocentric conceptual tradition that relegates matter to a passive and inert object, we nevertheless believe that the theoretical move adopted by new materialism risks replacing one metaphysics with another: from the metaphysics of anthropocentrism to the metaphysics of entanglement.

This is due to the ahistorical dimension of the concepts of relationship and matter developed by the new materialism, which doesn't allow us to see and thematize how the different connections between humans and nonhumans developed historically and materially, from a dialectic between material and social elements.

Resting on an ahistorical materialism, MSJ risks reintroducing an idealistic view of material relations. Rather than pursuing a critical-genetic inquiry into the socio-historical ways in which such relations of domination are established, it reiterates an ontological question. The premise of such a movement is that from the delineation of a new entangled ontology, an inclusive paradigm of justice, as relational and intersectional, directly follows (Tschakert et al 2020). But, as critics, especially feminists (Butler 2004), have been pointing out for decades, ordering social belonging from an ontological question is precisely the prerogative of anthropocentric thinking. In fact, anthropocentrism takes the move from a metaphysical thought that *a priori* and ahistorically posits its own postulates to explain (and order) the real, concealing power relations determined behind categories deemed immutable.

In order to ground ethical-political thinking on an ontological question, we believe an analysis of the historical-material assumptions from which the hierarchical dichotomies that one wants to

overcome originate is essential. What we want to argue is that the MSJ's attempt is not enough. Even if criticizing anthropocentric ontology is inevitable in order to criticize anthropocentric ethics, we believe that one must avoid reducing ethics and politics to ontology. In fact, there is a risk of falling into a naturalistic fallacy, which is deriving ought-to-be from being. In other words, it is not enough to replace one ontology with another. We, therefore, think that the attempt to imagine a relational subject must be accompanied by a materialism that is able to elaborate a socio-historical analysis of the relations between the human and the nonhuman in order to explain how and why certain axes of power and subordination of one to the other exist. We believe it's crucial to re-emphasize the historical-social dimension of materialism in order to prevent the phenomenon known as "fetishism", initially outlined by Marx and revisited in the field of animal studies in more recent times (Shukin 2009; Maurizi 2021).

To exemplify, let us take Marx's analysis in volume III of *Capital* in relation to the so-called "Trinitarian formula". Classical economists identify "capital and profit, land and land rent, labor and wages" (Marx 1974, 927). They naturalize what are specific historical relations of production, thus concealing the social relations of exploitation. Marx argues that in the capitalist mode of production, "land operates as an agent of production" (929), but this does not depend on the land's own characteristics. Indeed, Marx argues that this is precisely the fetishistic mystification enacted by bourgeois economics, which is exchanging the historically determined form of an object for its essential properties. It is only in the specific context of a particular social relationship that land becomes land rent. Therefore, it is only by adopting a historical materialist perspective that one can illuminate, for instance, how bourgeois thought associates land with land rent, or, drawing inspiration from Shukin's analyses: "the specific cultural logics and material logistics that have produced animals as forms of capital" (Shukin 2009). Back to Marx's specific example, that land is in an entangled relationship to the social system is a point on which both classical economics, Marx and the proponents of MSJ would agree. What differentiates a thought that merely reflects a static reality from a critical and political thought is that it accounts for the *type* of relationship that is brought about: in this case, the identification of land as a means of production.

The shortcomings of new materialism are also reflected in another problem, namely the redefinition of agency. In fact, one of the key points on which the MSJ is articulated is the reformulation of agency starting from a flat ontology, which rearticulates the problem of agency by dehumanizing and distributing it among a series of social actors. Instead of being the essential category characterizing the identified human endowed with consciousness and intentionality, agency

is redefined as a property of the relationship between different actors: human, nonhuman, and technological (Bennett 2010).

We consider this thematization of agency politically problematic. Although the revival of the theme of agency as opposed to its dissolution typical of post-structuralism is to be welcomed, we believe that an indistinct distribution of agency among actors produces impolitical outcomes. Indeed, in the ethical-political sphere, it is crucial to have a conceptual demarcation axis that can distribute not only agency but also liability for actions.[3] This is all the more evident in the way the ecological crisis is addressed. As noted by Coole (2013), it is undoubtedly useful to establish that climate change is the result of a relationship involving human and nonhuman actors, but from an ethical-political point of view it risks disabling the attribution of greater or lesser liability.

Let us take the case of the Northeast blackout of 2003 in the USA, which caused countless damages, analyzed by Bennett (2010). Bennett's interpretation is that, given the multitude of actors with agency (both human and nonhuman), it is impossible to attribute responsibility for the event to anyone specifically, a position incidentally shared by the FirstEnergy Corporation itself, which was called to account for the problem. We believe that this type of analysis is exactly the political risk run by a theory that is based on such a materialistic view: ahistorical and metaphysical, unable to attribute blame and accountability on a political level.

The risk is establishing a totally contemplative rather than political attitude. It's crucial to understand how and why there is an agential asymmetry of actors, and instead of working out the summation of oppressions using an intersectional logic (Tschakert 2020), to try to imagine the constitution of a political subject capable of acting in the socio-historical real.

## 4 Anti-Anthropocentric Practicalities

Once the main theoretical limits and potential of MSJ have been delineated, our argument moves to the practical dangers that this shift brings with itself. In this section, we will briefly expose the material risks MSJ's scholarship is aware of and advance a broader self-reflection about posthuman academic work. Our aim is to focus on the

3 The literature exploring agency and non-human agency is extensive, and a comprehensive analysis of it exceeds the scope and objectives of this article. Within the confines of this article, our focus lies particularly on the theories advanced by Bennett (2010) and Barad (2007), characterized by a pronounced normative nature. A different case is Latour's Actor-Network Theory (2005) developed as a 'sociology of associations', avoiding both anthropomorphizing perspectives and normative postures (Volontè 2017).

applicability of this idea of justice, and our core argument is that stronger ties need to be tightened between an academia that is not enough politically engaged, and the (not only environmentalist) social movements that fight for the recognition of the "less-than-human" or "not-fully-human" people (Butler 2004; Marhia 2013). What we want to claim is that by keeping the discussion on ontological and theoretical levels, even the most activist scholarship fails in building a counter-hegemonic coalition. Even if extremely fascinating, we believe that demonstrating nonhuman subjectivity is an end in itself if it doesn't serve the further objective of intersecting common struggles.

### 4.1 MSJ's Operational Limits

Speaking of MSJ involves prefigurative work that entails imagining how to concretely apply a multispecies approach in real legal institutions. We will give a glimpse of the complex and interrelated issues this operalisation brings to light (for deeper scrutiny see Celermajer et al. 2021).

First, the Western global and local justice system is based on persons entitled to rights. Extending this framework to nonhumans means recognising their personhood, which holds the risk of falling back into anthropocentrism, thus failing to engage with a relational subject of justice.[4] The rights' logic opens up further doubts. In fact, extending it to nonhumans implies that these entities ought to "participate in decisions about the institutions that will regulate their lives and relations" (Celermajer et al. 2021, 130). This would happen thanks to human mediation and representation. This brings us to the second problem: how can human institutions include nonhuman entities? If we accept ecosystems' ability to communicate, should we include them directly into political decision-making? What kind of nonhuman language is embeddable? What is the role of humans in facilitating this process? One of the answers that posthuman scholars are discussing is recasting humans as "diplomats" (Latour 2004).

4 Extending human rights to non-humans without considering political consequences may lead to extreme outcomes. For example, in the USA corporations enjoy legal personality, and this has allowed them to appropriate the international language of human rights to challenge certain democratic decisions made by states. A concrete case of this mechanism happened in 2003, when the multinational TechMed opposed the government of a state in the Mexican federation after the latter decided to terminate the energy supply contract that had been signed by the previous government. In order to support the use of the proportionality test in determining whether the Environmental Protection Agency's decision not to renew the permit involved expropriation, the court (ICSID) relied entirely on four different decisions of the European Court of Human Rights (https://www.iisd.org/itn/en/2018/10/18/tecmed-v-mexico/; Castillo 2012). The paradoxicality of this decision is evident: an artificial entity, such as a corporation, can now use human rights against democratic decisions.

There would be no need to ground a common language, but only to represent different interests.

As Eduardo Kohn states, the goal might be:

> to arrive at a conceptual framework through which different actors, be they shamans, biologists, or lawyers, can understand their respective worlds in new ways, thanks to a set of emergent concepts that arise from each of these worlds, but cannot be reduced to any of them. (Kohn 2021, 33; transl. by the Authors)

The third risk arises from the fact that different interests involve conflict. Who and how to decide what set of relations has a more valuable existence? This apparently unsolvable dilemma materializes, for example, in the tensions between animal rights activists and "hunting" Indigenous communities (Kopnina 2017). It is not uncommon to be confronted with different narratives about the same conflict concerning animal rights. Different narratives involve different power relations in structuring whose voice is not only more worthy of being heard, but also is more capable of being louder. Environmental NGOs often picture endangered species as entities that must be safeguarded indiscriminately, regardless of the specific ecosystem and political network in which they live. Wales, koalas, seals, elephants: they all fall into the same set of animals whose lives need special protection. On the other side, there are Indigenous peoples who have been actually living and relating with real animals, inhabiting a concrete environment and grounding both a local economy and a cultural identity through their relation with it. If MSJ aims at judging relationships, it is the type of interspecies bond that needs to be taken under scrutiny. Given that biodiversity loss and the "sixth mass extinction" is an effect of climate change driven by the Western capitalist economy, does the death of a polar bear caused by North Pole melting have the same moral weight as the death of a sea turtle caused by local hunting? How many (Indigenous, Black, Brown, "not-fully") human lives are worth preserving a (inexistent) untouched virgin nature? Is multispecies justice a problem of Western white privileged men and women?

## 4.2 Detachment From Human Inequalities

Moving our argument further, we think that power dynamics need to be kept at the core of research self-criticism also as a purely human issue. MSJ's scholarship must be careful of the risk of recreating intra-species violent hierarchies. Discrimination, ostracism, dehumanization of non-Western, non-white, non-affluent, non-adapted, and non-resilient individuals may be re-enacted if MSJ doesn't face historical and ongoing colonial, capital and patriarchal global order.

Here we think it's particularly important to join the call for decolonizing Western posthumanism, as several inadvertent neocolonial tendencies can be found. In fact, multispecies approaches run the risk of appropriating Indigenous philosophy. A growing number of Indigenous scholars are blaming posthumanist inclination for expropriating Indigenous concepts in a "cherry-picking" way (Todd 2016). Despite the insistence on ontological multiplicity, in fact, the danger is relying on a:

> ethnographically reductionist work that does not recognise the significant diversity of beings, kinds of relationship, and forms of obligation that characterize human/other-than-human relations in diverse Indigenous worlds. (Fitz-Henry 2021, 6)

MSJ, and posthuman research in general, are advancing theories that may exclude instances of Indigenous knowledge that has been recognizing nonhuman agency for centuries. There's not only a problem of cultural appropriation, but also of disconnection of the spiritual and sometimes personal, kinship, totemic relationship with the nonhuman environment. This caesura reinforces precisely the kind of dualism that MSJ ideally rejects, solidifying a division between the "West and the rest", the material and the spiritual, the scientific and the irrational. In the words of Tanasescu:

> the political implications of Indigenous ways of life are vastly more radical than those of rights of nature. In identifying Indigenous philosophies with rights of nature too closely, we run the risk of diminishing the radical potential of alternative political arrangements. (2020, 25)

The assimilation of indigenous ontologies to processes born within Western culture disarm their transformative potential. Equally, the current process of translation of multi-species ways of life into a language comprehensible to the West, risks subsuming and domesticating a potentially subversive radicality.

This concern leads us straight to our point of problematizing the insufficient political engagement of academic research. Celermajer and colleagues themselves are aware of the fact that the pressing issue of MSJ can sound extremely detached from both governments' discussions and the "bread-and-butter issues" of not privileged people (Celermajer et al. 2021, 133). Multispecies justice and its relational materialist ontology sound paradoxically dissociated from the materiality of the real world. It does seem elitist to claim nonhuman justice without facing our own intra-species discrimination and basic justice needs. As Fitz-Henry put it:

> What work still needs to be done to ensure that potential allies and other critical interlocutors who are *not* radical environmentalists are not alienated, distracted, or otherwise put off by what can sometimes appear to be the pursuit (and the conceit) of privileged, overwhelmingly white scholars? (2021, 3)

Is there a way to focus on cows, corals, or mineral agency without avoiding considering the humans whose possibility of self-determination is still suppressed, denied, and ostracized? Said otherwise, how can we -white Western scholars- avoid being caged in an ivory tower and inadvertently helping to raise its walls? How can MSJ become an ally for socio-political struggles? And more widely, is it possible to overcome the separation between academia and social movements? In today's university system, is there space for militant research? There is an insufficient range of politically and legally aligned posthuman studies, not involved enough in concrete political debates and demands. There is not enough posthuman research that actually tries to understand what supporting first needs human struggles or social movements may entail.[5]

Therefore, we advance the need to reflect critically on our own positionality, as it's quite clear that even just accepting the role of "researcher" is a political choice. It implies playing the game of the intersectional power structure that keeps the University going, with its moral pros and cons. Introducing the brilliant Italian edition of *Undercommons* (Harney, Moten 2021), the Technoculture Research Unit working group writes:

> The point is that the surplus value of what we produce at the university – but also elsewhere to the extent that it is social life itself that is valued – is very often taken away by us from the minority communities of which we are part, where transformative critical thought is still produced, which we translate (clean, discipline, transport) into our academic work. [...] a form of professionalization is demanded of us that is not only the injunction to translate by expropriating the commons of our community, thus to administer the world, but to also administer everything outside the world, including ourselves. (Technoculture Research Unit 2021, 23; transl. by the Authors)

**5** One area of study that diverges from this pattern is, for example, the rich research trend of Critical Animal Study (Tylor, Twine 2014; Nocella et al. 2014; Nocella et al. 2017), which unfortunately we cannot afford to explore in detail here. One of the main concepts on which CAS is based is the idea of total liberation, which embraces a truly intersectional perspective towards oppression across class, racial, gender, species, and national boundaries, against global capitalism and domination of all kinds. Its ecovegfeminist roots reveal the deep anti-academic soul of this field. As Best writes, the aim is to avoid "scholasticism, jargon-laden language, apolitical pretense, and theory-for-theory's sake style and mentality", as CAS is aware of "historically constructed ideologies and systems of power and domination" (Best 2007, 3).

We clearly do not claim that the only option is the rejection of academic work *per se*, but we are calling for a higher level of self-criticism in an erudite world that, for systemic reasons, consists mostly of privileged people. We think it is vitally important to contrast this kind of extractivist and disciplining academic attitude. Sticking to the case of MSJ, despite its critical self-awareness, it often fails to be inclusive and intersectional by, for example, neglecting and ignoring racist structural violence. Referring to the nonhuman and material turn, Mirzoeff writes:

> This discursive move is not intentionally racist, except insofar as it is a mark of a certain privilege to be able to overlook race. My anxiety with the material, nonhuman, and universalist turns in academic discourse is, then, how quickly we seem to forget all the work that has been done to establish how and why so many people have been designated as nonhuman and bought and sold as material objects. (2018, 7-9)

We detect the urgency to think more fully about processes of dehumanization, racialization, discrimination, and oppression of humans, before extending this process to nonhumans.[6] Moving to the conclusion, we want to stress the need for a deeper understanding of how to relate, as academics, to human "inter-generational rage and loss" (Fitz-Henry 2021, 12) in order to convey different kinds of agencies around the same common anti-hierarchical soul.

## 5 Conclusion

In this essay, we engaged with the emergent notion of Multispecies Justice in order to survey the potentials and limits of theorizing a relational and more-than-human justice. Our discussion started with the presentation of the MSJ concept, which is rooted in an anti-anthropocentric critique of Climate Justice and in an anti-liberal-humanistic critique of the justice system in general. After an overview of the characteristics of MSJ's innovative subject of justice, we moved to a closer analytical evaluation. Firstly, we delineated an ethico-political critique to the ahistoricity of the flat and entangled ontology on which MSJ is embedded. Then, we presented the material and

6 Of course, there are great exceptions to this tendency. Just to cite one, Katherin Yusoff's work connects the idea of Blackness, the eradication of indigenous peoples and the ontological wake of geology. In *A Billion Black Anthropocene or None*, she analyzes how "biopolitics [is] achieved through geologic means", as imposing inhuman ahistoricity and inorganicity is both a biopolitical "division of matter" and a regime of "ordering matter", which divides policy from agency (Yusoff 2018, 78).

practical risks of MSJ's operability, concluding with a broader reflection on the need for a more socially engaged academia. We believe in the possibility of letting academic counter-hegemonic tendencies flow out in the real social conflicts, through the interstices left uncovered by biopolitical (interiorised) control.

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e-ISSN 2723-9640

**JoLMA**
Vol. 4 — Num. 2 — December 2023

# The Consequences of Enactivism on Moral Considerability in Environmental Ethics

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**Abstract** Enactivism is a model of cognition that emphasises the dynamic interactions between organisms and their environment. This paper analyses the link between holism and individualism in animal and environmental ethics through the conceptual tools provided by the enactivist programme, particularly through a perspective of relational values emerging from the dynamic interactions of organisms with the environment. In our opinion, the more dynamic concept of value that enactivism implicitly offers can be helpful in resolving conflicts within green ethics. Concurrently, its reconceptualization of agency in simple organisms contributes to the discourse on the attribution of moral consideration to non-human entities. These insights have implications for both the moral deliberation of the individual agent and decisions taken at the political level. We briefly address the associated philosophical and practical challenges in ethical deliberations.

**Keywords** Enactivism. Environmental ethics. Animal ethics. Holism. Relational Value.



Edizioni Ca'Foscari

**Peer review**

Submitted 2023-09-29
Accepted 2023-12-30
Published 2024-02-07

**Open access**



**Citation** Fizzarotti, C. (2023). "The Consequences of Enactivism on Moral Considerability in Environmental Ethics". *JoLMA*, 4(2), 221-242.

**DOI 10.30687/Jolma/2723-9640/2023/02/005**

# 1 Introduction – Reconciling Individualist and Holistic Ethical Perspectives in Animal and Environmental Ethics

## 1.1 The Dichotomy: Individualist vs. Holistic Approaches

Attempts to explain and systematise human morality are often characterised by marked differences on the meta-ethical level. Different concepts upstream have an inevitable influence on the normative level and, ultimately, on practical deliberation. Diverse systems rely on various epistemic foundations. For instance, moral objectivism presupposes ontological commitment to the existence of moral facts. Meta-ethical orientations shape the contours of ethical dialogue. It is undisputed that the specific set of foundational philosophical assumptions that underpin ethical reasoning provides a heuristic framework, influencing the epistemological, ontological, and practical dimensions of moral life. Part of what we want to develop in this essay has to do with metaethics, but not everything. The issues related to the attribution of intrinsic value, which is one of the fundamental nodes of many disputes in the field of animal and environmental ethics, will be tangentially analysed. Generally, this concept is defined as "something that has value in itself", independent of external factors, not-instrumental (O'Neill 1992). The contrast we will analyse between holists and individualists in fact rests on two different concepts of intrinsic value.

In proposing a third way, one of the arguments we will explore here is how enactivism can challenge the notion of intrinsic value as a fixed attribute, proposing it instead as a co-emergent property resulting from ongoing interactions between organisms and the environment. This perspective, in our opinion, allows for a more dynamic and context-dependent understanding of what is valued and why.

## 1.2 The Divide Between Individualism and Holism

Speaking of different meta-ethical assumptions and their consequences, one of the starting points of this paper is that different positions in environmental ethics and animal rights (such as holism and individualism) are also based, among other things, on distinct meta-ethical assumptions. Few areas have generated such intense disagreement as the fields of animal and environmental ethics (Campbell 2018). This debate stems from fundamentally divergent perspectives on the nature and location of moral value in the context of environmental concerns. In recent years, the need for a philosophical understanding of our species' responsibilities towards the natural world and its inhabitants has made the profound tension between holistic and individualist perspectives become clear (Faria, Paez 2019).

Individualist ethics prioritises the interests and intrinsic value of individual entities (generally animals but, in principle, could also be plants or other organisms) (Andreozzi 2015; Mikkelson 2018; Allegri 2020). Philosophers such as Tom Regan and Peter Singer have famously championed the rights and interests of individual animals, challenging us to recognise and respect their sentience and intrinsic value (Andreozzi 2015; Villanueva 2018; Allegri 2020). Individualist ethics, in this context is primarily concerned with the welfare and rights of individual living beings, often emphasises the moral consideration of animals on the basis of attributes such as sentience or the ability to suffer.

In contrast, holistic ethics emphasises the interconnectedness of nature, suggesting that moral standing does not reside in individual entities, but in collective wholes, such as species, ecosystems or even the biosphere. In this case, the moral concern is for the broader patterns and processes of nature, rather than for isolated entities (De Souza, Tharakan 2017; Callicott 1988). Proponents of holistic ethics argue for the primacy of the ecological whole, emphasising the interconnectedness and interdependence of natural systems.

This essay delves into the intricate landscape of these ethical divisions and attempts to contribute in the direction of harmonising them. We will focus in particular on the question of moral considerability and how the enactivist perspective can lend a hand in the search for an alternative between conflicting axiologies.

### 1.3 Bridging the Gap: Efforts at Reconciliation and Their Implications

These perspectives, both centred around a 'green sensibility', often clash. Many have tried to reconcile them, yet some label these efforts futile.

Those in favour emphasise the interdependence between organisms and ecosystems, proposing hybrid models where moral consideration is not dichotomous. These include mediating different values (Aaltola 2005), hierarchizing them with an extension of the domain of morality on a concentric basis (De Anguita, Alonso, Martin 2008; Callicott 1988). There are also 'secular' attempts prioritizing practical over theoretical aspects in animal and environmental ethics.

Critics of reconciliation, argue for the incommensurability of the values (Faria, Paez 2019) and stress the importance of a solid theoretical framework in order to be able to motivate action effectively. They caution against theoretical dilutions or compromises, considering a solid philosophical foundation essential to ensure precise practical interventions.

Remaining on a formally very general level, which inevitably simplifies the complexity of the issue, those in favour of a reconciliation argue that the two ethical frameworks are not mutually exclusive and can indeed be integrated to address different aspects of our moral obligations towards animals and the environment. Many view the animal-environmental ethics division as overstated or a "false problem" (Jamieson 1998). In the now landmark "Animal Liberation is an Environmental Ethic", Jamieson, for example, presents an integrated theory, stating that the value of animals and the environment can go hand in hand.

The idea is that by recognizing species-ecosystems connections, an ethical stance acknowledging both individual and collective value is possible. As an alternative to this, various forms of moral pluralism have been proposed (Palmer 2013), although the problem of the division between holism and individualism arises again whenever a conflict between different values is found (Palmer 2013) and for this reason, according to some, the basic principles of animal and environmental ethics are intrinsically incompatible (Faria, Paez 2019). There's concern that reconciling these ethics might weaken their core principles, leading to an approach that fails to adequately address the concerns of either camp.

The differences between these research agendas are decidedly significant: individualist ethics often relies on an ontology of individual beings with distinct boundaries and intrinsic value, holistic ethics introduces a more relational ontology in which value emerges from intricate networks of relationships and systemic dynamics (Andreozzi 2015; Allegri 2020). The different positions in this broad research landscape rest on different worldviews. A quick example (which we will elaborate on later) of incompatibility is found in scenarios involving invasive species. From an individualist ethical point of view, every animal, including members of an invasive species, has an intrinsic value that justifies protection. However, holistic environmental ethics could support the removal of these species in order to preserve the integrity of the ecosystem while prioritising the collective well-being of the ecological community. These are two different axiologies that, as we have mentioned, for many authors are irreconcilable on a theoretical level (Faria, Paez 2019) while, for many others, a rigid application of a single value system is inapplicable to such issues due to their complexity (Weston 2013).

Literature review reveals a considerable number of scientific articles that address the relationship between the two disciplines (Rolston 2022). Interest in this topic seems to have been on the rise over the past few years, in accordance with a trend that could be attributed to the recognition of the interconnectedness between the two, which prompts scholars to explore potential theoretical reconciliations. The emerging awareness within the public debate of the

need for a holistic and integrated approach to ethical engagement with animals and the environment has probably contributed to the expansion of the literature (Schlottmann, Sebo 2018; Bilchitz 2019).

However, the reconciliation of holistic and individualist perspectives in animal and environmental ethics is far from being a mere academic exercise. It cannot simply consist in the merging of two schemes, but in carefully and critically forging a new path that captures the essence of both and addresses their limitations. The urgency of this reconciled approach is underlined by the growing environmental crises (Taylor 2009). From climate change to biodiversity loss, the stakes of our ethical decisions have tangible consequences for both individual organisms and entire ecosystems.

Developing this reconciliation could benefit both these disciplines (as it would allow them a broad approach to different kinds of practical issues and a more effective management of competing but somewhat overlapping values) and society as a whole (which could benefit from integrated and consistent policies). Regardless of the possibility of defining this issue definitively, it is quite evident that a rapprochement between holistic and individualist perspectives would bring tangible benefits. Such a reconciliation could provide the theoretical foundation for the formulation of ethical guidelines capable of providing a conceptual framework for decision-making in a variety of fields, from agriculture to tourism, taking into account both the environment and the needs of human and non-human individuals.

## 2 Rethinking Ethical Interconnectedness: Nature, Animals, and Us

### 2.1 Bridging Holism and Individualism Through Enactive Agency

So, we are attempting a reconciliation. More precisely, we are attempting a reconciliation between holism and individualism that passes through the redefinition of the human and animal mind and, consequently, through a new image of the moral agent.

Specifically, this path is offered to us by enactivism, a research programme or, more ambitiously in Shaun Gallagher's words, "a philosophy of nature" with significant implications for the scientific investigation of the mind. Enactivism goes beyond being a mere research methodology. In its most recent interpretations, it stands as a genuine philosophical framework that draws on pragmatism, phenomenology and cognitive science (Gallagher 2017). Among its most distinctive features, enactivism redefines agency by emphasising the embodied dimensions of perception and cognition of moral facts (Zahidi 2014; Maiese 2018).

One of the central concepts of this approach is that of 'autopoietic system', a term developed by Maturana and Varela (1991), referring to a self-creative entity capable of maintaining and reproducing itself, demonstrating a form of self-sufficiency and autonomy. Among other things, it is precisely this updated definition of autonomy that, in our opinion, may be relevant for the attribution of value in environmental and animal ethics.

More generally, the enactivist approach contrasts with the classical models of cognitive science, which treat cognition in terms of internal mental states (Zahidi 2014) and symbolic representations of information received from sensory inputs.

Models pertaining to the enactivist perspective, building upon the foundational work of De Jaegher and Di Paolo on the concept of participatory sense-making (2007), emphasise the dynamic interactions between organisms and their environments and the role of thinking beings as primarily acting beings (Reid, Mgombelo 2015; Maiese 2018). Organisms are seen as self-creating systems, with cognition deeply rooted in their ongoing survival. In essence, bodies are not just passive tools through which our brains operate, but are an integral part of how we think, perceive and act in the world. For instance, consider how a bird's body is not just a vessel for its brain but is integral to how it navigates its environment, finds food, and interacts with other birds. The embodiment is crucial in understanding the bird's (ethical?) standing in environmental and animal ethics. This concept emphasizes the interactive process through which agents, be they human or non-human, engage in shaping their understanding and interaction with the world. In this context, moral action arises from the dynamic interaction between an embodied agent and its environment, rather than being determined exclusively by internal mental states or abstract moral principles (Heras-Escribano, Noble, de Pinedo 2013; Van Grunsven 2018). To say this is to posit that value is inherently relational, grounded in the active engagement and interdependence of living beings within their ecological niches. In short: recognising a situation as morally salient motivates us to perform certain types of actions. From an enactivist perspective, living beings are autopoietic systems that maintain their identity through dynamic interactions with the environment. Agency, therefore, becomes a question of how effectively an organism can navigate and adapt to its environment to maintain its viability. Indirectly this implies that perception is not just a passive reception of information but is intrinsically linked to action (Zahidi 2014; Maiese 2018; Van Grunsven 2021). Those facts are relevant for two different reasons.

a. First, because at the metaethical level it allows us to introduce a more flexible system for dealing with possible clashes between individualist and holistic values: if the attribution of value is situated in a dynamic context, there is no need to

adhere rigidly to one approach over another. Shifting deliberative questions related to the moral considerability of individuals or ecosystems to this level allows for greater flexibility with a view to a pluralism that can nevertheless be said to be non-arbitrary and based on strong contextual elements.

In this context, moral considerability refers to the quality or status of being worthy of ethical consideration. In environmental ethics, this consideration traditionally extends beyond human beings to include non-human entities such as animals, plants, ecosystems, and even geological formations. It suggests that these entities have moral significance and thus deserve ethical consideration in our decisions and actions. By considering the specific context and possibilities that shape an individual's actions, enactivism offers a less implicitly value-laden analysis of moral behaviour (Van Grunsven 2021). Values and norms arise from the purposes and goals of organisms as they navigate and interact with their environment. In this light, living beings are not passive receivers of value but active participants in generating it through their engagements with the world. This dynamic view can also have very concrete implications in practice, emphasising the importance of engaging with others and participating in the ongoing co-constitution of ethical reality, which is fundamental in a complex and multi-perspective context such as the issues addressed by animal and environmental ethics.

b. Enactivism makes it possible, by suggesting that relatively "simple" organisms can be regarded as possessing "agentivity", to consider animal intelligence differently (Zipoli Caiani 2022). This fact, as much of the literature on the normative consequences of studies on animal cognition attests (Petrus, Wild 2013; Allen, Bekoff 2007), has undoubted relevance for the attribution of moral status. If we assert that genuine agency derives from the ability to consistently fulfil the requirements for the survival of a biological system, it can be said that there are many beings that possess it, and this fact may be relevant should we decide to use this information to ascribe moral status to them. These kinds of dynamic and wider definitions can also apply to 'organisms' in a broader sense. Take, for example, a coral reef. From a certain perspective, the coral reef is an autopoietic system in which every organism, from small polyps to fish, contributes to and maintains the overall health and identity of the system through dynamic interactions. Whose moral interest is to be considered here? The coral reef or the organisms that make it up? Both? The point is to get out of dichotomous thinking when it comes to deliberation in these matters. In our opinion, considering a new concept of agency allows us to move in this direction.

To sum up: we argue that the shift to a more embodied understanding of cognition and morality allows for a more nuanced handling of ethical dilemmas in animal and environmental ethics. Enactivism facilitates a flexible and context-sensitive approach to moral deliberations, allowing for a more balanced consideration of individualist and holistic values. By advocating a dynamic ethical framework in which value attribution is not fixed, but evolves with changing contexts and interactions, we intervene in the ongoing debate between individual rights and collective ecological well-being.

## 2.2 Interconnected Ethos: Enactivism's Holistic Link Between Environmental and Animal Ethics

Developing point (a): an enactivist perspective redefines moral decision-making through the idea of a shared implementation of an axiological domain. In this view, intrinsic value is not independent of human interests and needs, but rather emerges through the enaction process.

Konrad Werner and Magdalena Kiełkowicz-Werner (2022) in their article "From Shared Enaction to Intrinsic Value. How Enactivism Contributes to Environmental Ethics" propose precisely to consider natural environments (broadly defined) as axiological domains that have gradually emerged during evolution. Such domains involve entities capable of solving complex problems in their environments and are characterised by relatively stable patterns of value balancing. Considering the definition of agency we provided earlier, the emergence of these domains is not limited to human beings, but includes a wider range of organisms, up to and including the entire biosphere.

Implicitly, this suggests that enactivist perspectives can contribute to our understanding of intrinsic value and its relationship to human-environment interactions. Simply put: enactivism provides, according to the authors, a framework for understanding how our interactions with the environment shape our perceptions and ethical judgements. It emphasizes that understanding and responding to our environment is an active, reciprocal process, integral to shaping our cognitive and moral frameworks.

To summarise point (b): enactivism can inform animal ethics by emphasising the greater dignity of the embodied and situated experiences of animals and the ethical implications this may have on our interactions with them. Although implicitly, enactivism may allow for a more radical challenge than other perspectives to the traditional view that animals are mere objects or resources for human use, and at least theoretically allows for consideration of their subjective experiences and welfare. This is implied in the possibility of recognising animals as active agents in their own right and thus potentially capable of participating in ethical relationships. Any being that actively

engages with and influences its environment can be considered, at least, a moral patient, thus expanding the traditional boundaries of ethical consideration. From this, of course, it does not follow that they should also be considered agents in a moral sense, but it does provide us with additional reasons to pay attention to and respond to the lived experiences and intentional expressions of non-human beings.

The idea is that by integrating enactivism into environmental and animal ethics, it is possible to develop a more holistic and inclusive approach that takes into account the complex interactions between humans, the environment and other living beings. In essence, the agency of all beings within an ecosystem is acknowledged, attempting to offer a more balanced and inclusive framework for environmental ethics than one based only on 'high' characteristics in an anthropocentric sense.

Both enactivism and the goal of reconciling animal and environmental ethics are grounded in interconnectedness. Recognising the intrinsic relationship between organisms and their environment aligns well with the holistic approaches of environmental ethics and the individual considerations of animal ethics. If successful, this venture could bridge the gap between individual and collective value assessments. Rather than dividing value into intrinsic or instrumental, a green and enactivist ethics would focus on relational dynamics, emphasising the co-emergence of value from the organisms-environment interactions. Ethical principles, in this view, would not be seen as static guidelines, but as evolving constructs shaped by real-world interactions and challenges. By viewing ethics as emerging from our intertwined relationship with the world, enactivism can inspire a more holistic and integrated approach to our moral responsibilities towards both individual organisms and the ecosystems they inhabit. Models like this allow a deeper understanding of social life and care practices, emphasising the dynamic interdependent processes that give rise to an embodied self and its mundane domain of interactions (Loaiza 2019). These interdependencies, which extend far beyond the individual organism, play a crucial role in the co-emergence of selves and allow for moral consideration as not only concerning individual entities or ecosystems, but encompassing broader and more complex interdependencies within ecological systems.

Taking the classic example above, we can now re-examine it through an enactivist lens to offer a more nuanced resolution. Let us assume that an invasive species threatens the balance of an ecosystem. Traditionally, a holistic approach might advocate culling the invasive species to protect the ecosystem. Conversely, an individualist view, particularly from an animal rights position, would probably oppose culling, emphasising the intrinsic value and rights of each animal.

However, if we emphasise the interconnectedness and dynamic interactions between organisms and their environment, we can suggest a different approach. If we consider not only the immediate ecological impact, but also the long-term relational dynamics between the invasive species and the ecosystem, we can explore measures such as habitat modification, the use of natural predators or even controlled relocation, rather than outright culling. This sort of enactivist approach exemplifies how the ethical dilemma can be reframed to consider a broader range of factors, including the potential for the ecosystem and the invasive species to evolve together in a mutually beneficial manner. It also highlights how moral deliberation in environmental ethics can transition from static, binary choices to dynamic, context-sensitive solutions that acknowledge the interconnectedness and co-dependency of living beings and their environments. The point is not specifically to use a single solution or axiology but rather to realise that what may be a right answer today may not be right tomorrow. The set of connections that characterises a given situation must be taken into consideration before acting. If value depends on relationships, what may be valid for an intervention in the rainforest is not necessarily also valid, for example, in the Italian countryside.

## 2.3 From Midgley to Enactivism: Interwoven Threads of Interconnected Ethics

In light of (a) and (b), enactivism emerges as a fresh and powerful conceptual lens through which to re-evaluate the axiological foundations of animal and environmental ethics. Its central tenet revolves around the intertwining of perception, cognition, and action, thus offering an opportunity to bridge the disconnect between holistic and individualistic views.

The value of enactivism in the context of animal and environmental ethics is confirmed by how these mechanics connect with other attempts to harmonise these perspectives. For instance, the framework offered by Mary Midgley's philosophy, recently revived by McElwain (2018) and employed by Callicott (1988), is closely linked to an organism's engagement with its environment and frequently alludes indirectly to notions such as autonomy, action and participatory sense-making (Midgley 2002).

Midgley opposes reductionist views that attempt to explain complex phenomena in overly simplistic terms. By emphasising the complexity and interconnectedness of life, she paves the way for a more harmonised understanding of animal and environmental ethics. In *Animals and Why They Matter* (1984), she challenges the so-called human exceptionalism and highlights the arbitrary nature of distinctions made between human and non-human animals, advocating for

a relational value system rooted in interdependence, care, and sympathy. This approach resonates deeply with enactivist principles, offering a vital bridge between the two perspectives. The concept of "mixed community" (around which McElwain's interpretation also revolves) is rooted in acknowledging that human beings are not isolated entities but rather deeply interconnected with other life forms, both ecologically and morally. This interconnectedness allows us to understand ourselves as part of a larger mixed community, composed of human and non-human animals, and requiring a moral response to the needs and interests of other creatures. Considering this definition, it is easy to state how Mary Midgley's philosophy, in particular with its focus on relational value, can interact with enactivist ethics. Her critique of reductionism and concept of a 'mixed community' align with enactivism's emphasis on the active, embodied engagement of organisms with their environment.

It has to be said that Mary Midgley does not speak of 'autonomy', 'action' and 'participatory sense-making' as they are understood in contemporary enactivist discourse. Despite this we think it is possible to state that the essence and implications of her work substantially intersect with these enactivist concepts. Although she did not focus explicitly on the concept of autonomy, her holistic view of human nature implies a belief in a strong agency, closely linked to the possibility of assigning moral responsibility to individuals and deeply embedded in this broader network of relations, human and non-human. Her focus on the moral implications of interconnectedness aligns closely with the enactivist understanding of agency as not just a property of isolated individuals but as emerging from the relational dynamics within an environment. For Midgley, moral action is not a mere result of abstract reasoning but is deeply ingrained in our emotions, instincts and evolutionary history. She often emphasised the need to understand our actions in a broader context, integrating insights from biology, anthropology, and other disciplines to create a richer understanding of human morality. Finally, Midgley's critique of individualism and her emphasis on our interconnectedness with the natural world align with the idea that we derive meaning and understanding not in isolation, but through our participatory engagement with the world.

All of these are threads on which attempts to reconcile animal and environmental ethics have already been set, and thus show us how the suggestions of enactivism may be relevant to this discourse. If we wish, the similarity between Midgley and enactivist perspectives can be pushed even further, instantiating on another little-discussed terrain in environmental ethics: the Gaia hypothesis formulated by James Lovelock (Lovelock, Margulis 1974), taken up by Midgley (2001) and discussed by Thompson (2010). If we 'scale' the concept of interconnectedness, in fact, we can consider the entire biota, the

entire planet earth as an autopoietic organism. As we saw in the coral reef example, the attribution of value also depends on the set of relationships we decide to consider. This further point of contact may also be relevant if one wants to investigate the 'harmonising' role of Midgley and Enactivism. In this context, however, we will limit ourselves to this mention.

## 2.4 Towards a Holistic Ethical Framework: Intersecting Enactivism, Pragmatism, and Midgley's Philosophy

More generally, a parallelism could be attempted between the recognition of the inter-relational domain by enactivism and the approach of Care Ethics (Urban 2014), which emphasise the dependent, situated, and relational nature of agents (Keller 1997).

This approach can be attempted from the shared emphasis on relationality and context of these two disciplines. In essence, for those perspectives, the moral essence of a situation flows from its constitutive relationships, emphasising individual responsibility and context-dependent deliberation. This has the consequence of highlighting the interdependence of agents and thus supporting a redefinition of autonomy, individuality, and agency. A comparable operation is carried out by Petr Urban in "Toward an Expansion of an Enactive Ethics with the Help of Care Ethics" (2014).

Many attempts at reconciliation are in fact moving on the level of a relational system of value attribution (Deplazes-Zemp, Chapman 2020; Norton, Sanbeg 2021) which is nevertheless capable of keeping the agent's perspective intact. The strength of those approaches lies in their ability to navigate ethical complexities through a deep understanding of context and relationships, offering a more responsive and adaptive ethical framework. Werner and Kiełkowicz-Werner's analysis (2022) is particularly enlightening for anyone moving in this direction. While many traditional ethical frameworks argue for the existence of intrinsic value independent of human interventions (McShane 2007), enactivists suggest its emergence through shared actions. This is in keeping with Midgley's thesis that ethical considerations are inseparable from human experience. In a world grappling with increasing environmental challenges, this insight has profound implications for conservation policies and strategies. Recognising that ethical judgements arise from our deeply embodied and situated interactions, enactivism emphasises the need for conservation strategies that address both ecological and human well-being harmoniously. Mediation is, to some extent, implicitly recognised in the perspective, underscoring that moral actions and decisions are deeply embedded in the specifics of relational contexts. This negotiation component allows us to make another important comparison

with another attempt to harmonise animal and environmental ethics: pragmatist perspectives.

Both enactivism and pragmatism resist dualities like mind-body or reality-perception. For enactivists, cognition is a dynamic embodiment of action and interaction with the environment (Chemero 2013; Corris 2020). Pragmatists, likewise, argue that cognition is not mere representation, but arises from active engagement with the world (Gallagher 2014; Crippen, Schulkin 2020). With its established focus on the agent's active engagement with the world, these two perspectives can be said to argue that our understanding of the world is neither purely objective nor subjective, but transactional.

It is precisely this transactional perspective that can have ethical significance. As Urban (2014) and Fuchs (2010) propose, albeit in different contexts, the ethical quality of situations derives from the meanings that emerge from the interrelationships between participants. This is almost like saying that, in environmental ethics, moral considerability arises from the dynamic interaction of organisms within their ecosystems.

It is not simply a question of how we understand the world, but how we act on that understanding. An ethical agent is not an isolated thinker, but an actor embedded in a network of relationships. This is the core of Midgley's reconciliation (Midgley 2021), that of many pragmatists (Racine et al. 2021), and also ours.

Regarding point (b) alone, it is appropriate to mention two additional bibliographical references that are relevant for our argument. Louise Barrett's "A Better Kind of Continuity" (2015) provides another lens through which enactivism can be applied to animal ethics. Although her approach may seem 'traditional' at first glance, it provides a crucial critique of Cartesian or computational models of cognition. By emphasising the embodied nature of all minds, Barrett introduces a broader perspective consistent with evolutionary and ethological insights. This implies that understanding animal minds through an enactivist lens could pave the way for broader criteria of moral considerability, linking the findings of Darwinism and ethology. In Barrett's perspective, enactivism presents, as we have seen, a framework for accounting for the autonomy of organisms within their ecological niches. It emphasises the importance of sensorimotor couplings, embodied interactions and the reciprocal shaping of an organism and its environment, facilitating a deeper understanding of cognition that does greater justice to the different ways in which animals perceive and engage with their world.

The shift from the purely cognitive to the moral sphere is not automatic, although we are certainly not the first to discuss the ethical implications of enactivism (Van Grunsven 2021; Urban 2014; Colombetti, Torrance 2009). Generalising, many of these approaches point in the direction of a "de-emphasis of the notions of individual autonomy and

responsibility" (Urban 2014) and urge us to consider inter-affective dimensions in ethical theory (Colombetti, Torrance 2009), which are particularly relevant (we add) to our discourse on environmental and animal ethics. For example, De Pinedo (2020) emphasises the normative dimension that emerges when we recognise organisms as agents or subjects of experience. By starting from the idea of life as self-creation and employing a normative vocabulary to describe it, De Pinedo asserts that adopting a normative perspective on certain phenomena can help avoid taking sides in the ontological debate between eliminativists, reductionists and emergentists. This, in his opinion, highlights the tension between understanding biology in purely factualist and realist terms and the need to recognise the dignity and ethical aspects of life. De Pinedo, referencing early analytic philosophy, contributes to post-cognitivist debates and emphasizes the anti-representationalism of the new paradigm. He counters a descriptivist view that makes ethical and normative judgements dependent on the discovery of independent biological and mental facts, warning against confusing normative issues with ontological ones (De Pinedo 2020).

Synthesising those insights from enactivism, pragmatism and Mary Midgley's philosophy, we can imagine a new framework. Here, ethical understanding emerges not merely from abstract principles but from the lived and enacted experiences of beings within their environments.

This framework assumes a continuity between cognition, action and environment, emphasising the importance of each component. It offers a more comprehensive lens through which to view moral considerability, one that incorporates the intricate web of relations that define existence. The agent's relationship with the world is not only cognitive, but also moral. In line with Midgley's perspective (2002), we can argue that ethics emerges not only from abstract principles, but from the lived and enacted experiences of beings in the world. By integrating the contributions of enactivism and pragmatism, we can better understand the complexity of these experiences and thus chart a more holistic and inclusive ethical course. This approach is particularly applicable in environmental ethics, where it, in theory, can guide a more nuanced moral decision-making.

## 3 Supporting Arguments: A Relational Approach To Value for Navigating a Complex Scenario

Let us summarise. The introduction of enactivism, with its emphasis on dynamic interactions between organisms and their environments, facilitates a nuanced understanding of value. If values are not static but evolve in relation to the ongoing enactions within ecosystems, they be seen as relational, emerging from the dynamic interplay of living beings and their environments, adapting and changing in response to evolving ecological contexts (a). Secondly, this implies that even simple organisms [and not necessarily organisms in the traditional sense, see the example of Gaia and the coral reef] can possess a form of agency (b). This has profound implications for animal ethics, potentially leading to greater moral consideration for a wider array of organisms, based on their active engagement with the environment. An embodied and dynamic understanding of value has direct implications on the practical side: recognising that ethical judgements are rooted in deeply embodied interactions can inspire policies that harmoniously address ecological, human, and non-human agency (Hayward 2013).

The aim is to overcome rigid dichotomies that often lead to philosophical and practical gridlock (Sans Pinillos 2022). By framing the debate as a dynamic interaction, enactivism offers a way to find common ground between the values of holism and individualism, leading to more nuanced ethical conclusions. Ethical dilemmas often arise in complex and ever-changing contexts. By reflecting on enactivist perspectives such as Fuchs', it is possible to emphasise how values can be understood as forms of perception, which reveal the qualities of an environment that are relevant to living organisms (Fuchs 2010). This emphasises the dynamic basis of moral considerability that environmental ethics, in our view, requires. Our approach to environmental ethics recognises that organisms co-produce their world and give meaning to environmental components through sensorimotor activities, shaping the ethical landscape.

Incorporating enactivism into our framework addresses both holistic and individualistic ends of the philosophical spectrum. On the one hand, it urges a move away from an overly atomistic understanding of individual entities, emphasising their embeddedness and relational engagements with the environment. On the other, it challenges the overly abstract or detached view of holistic systems by emphasising the active and embodied agency of the individual entities that constitute such systems.

This dual intervention helps promote a richer understanding of ethical scenarios, especially those concerning environmental and animal ethics. Fostering a shift towards dynamism, interconnectedness, and engaged ethical considerations over static, isolated and

abstract views. This can help clarify the inherent complexity of the moral situations addressed in environmental and animal ethics. The goal is to provide fertile ground for the development of more responsive, inclusive, and holistic ethical policies and practices.

## 4 Counterarguments: Ethical Complexity and Assumptions

This proposal clearly has limitations. The first is that it does not directly address the issue of the irreconcilability of holistic and individualist values (Faria, Paez 2019). Our discourse assumes that they are reconcilable, and so we do not present specific arguments in support of this assumption. Reconciliation is certainly desirable for the reasons we have outlined. Moreover, the idea of at least a rapprochement between perspectives is well established in the literature (Reed 2022; Rolston 2022) and we refer to these publications in to provide context for the present work.

The possible objections that interest us are different.

The first concern stems from the fact that enactivism is a cognitive theory and, possibly, a philosophy of mind. Unless we commit naturalistic fallacies, its application in the field of animal and environmental ethics is not obvious.

We answer this objection with an internal division corresponding the breakdown (a) and (b) we previously established. (b) In support of the relevance of enactivism for this discourse, it is possible to say that if scientific findings from ethology are relevant for questions of animal ethics (Würbel 2009), and empirical data from ecology and systems theory are admissible for questions of environmental ethics (Dicks 2017), why should enactivist considerations about the nature of human and animal agents not be admissible?

Furthermore, on the metaethical side (a), if it is accepted in the literature that the enactivist framework allows for rethinking the moral question by redefining the relationship of the human agent and the process of value attribution (Werner, Kiełkowicz-Werner 2022), why should this not apply to the field of animal and environmental ethics?

Staying with meta-ethical questions, it may be necessary to say a few words about our relational approach and its implications. A fluid approach to value could be understood as moral relativism, in which every act can be justified according to the dynamism of the context. Instead of adhering to fixed or absolute values, a dynamic approach recognises that values may evolve, adapt, or change according to different circumstances, cultural contexts or individual experiences. It implies an awareness of the fact that values can be multi-layered, interconnected and sometimes conflicting. This resonates to some extent with relativism in that it denies the existence of fixed, universal

moral truths that apply uniformly in all situations and cultural contexts. Recognising this fact, however, does not mean advancing the promotion of a form of uncertainty or ambiguity, which could potentially lead to ethical paralysis or lack of moral responsibility.

Furthermore, perceiving reality as transactional raises concerns about subjectivity and the elusiveness of shared truths. This viewpoint suggests reality could devolve into a bundle of subjective experiences, negotiations and understandings, which would risk leading to an erosion of shared realities, with the risk of hindering community or collective action.

How can one protect oneself from the same objections that are made, for instance, to pragmatist theories of value?

The answer lies in a sort of Kantian-Constructivist sense, asserting that adaptive values remain grounded in reality, despite their subjective mediation by human cognition. This aligns with the idea of a 'transactional' reality, in that our understanding of reality is mediated by our interactions and experiences. From this perspective, although moral principles are not 'out there' in the noumenal world, they are nonetheless objective in the sense that they are the result of rational deliberation and can be universally endorsed by all rational beings who share a specific 'vantage point' on reality.

There is an underlying structure to our experiences: biological, ecological, in terms of cognitive understanding and moral reasoning. While moral principles are not fixed or absolute, they are nonetheless deeply rooted in the biological and ecological contexts of our existence. In a world where reality is shaped by interactions, our transactions with the environment, with other beings and with each other would be judged by principles that can be rationally approved and justified. The relational bases from which they arise are not arbitrary but rather binding and this makes it possible not to deny objectivity in moral reasoning: ethical principles are grounded in the lived experiences and relational dynamics of individuals within their specific environments.

Similarly, the empirical data that define the status of us, animals and ecosystems cannot be disregarded within moral deliberation and, consequently, must be defended in a public context, in confrontation with other moral agents, with other politicians, with other activists. Relativism can be avoided using a public rationality and the maintenance of a strong naturalistic constraint (which, however, does not amount to a violation of Moore's Naturalistic Fallacy). Enactivism emphasizes the active role of the agent in navigating these complex moral landscapes, suggesting that ethical understanding is constantly evolving in response to changing circumstances.

It is precisely on this system that another possible objection is worth raising. Emphasising interconnectedness could lead to the paralysis of ethical decision-making. Recognizing every action's

far-reaching effects on a complex network might render decision-making difficult, as assessing every consequence becomes overwhelming. Understanding that our actions reverberate through this tangled web means that we must consider how even seemingly minor choices can have significant consequences elsewhere. This depth of impact can be daunting: individuals risk finding themselves in a state of 'analysis paralysis', where they think about a situation so much that every action is prevented because of the cognitive toll it takes.

Again, the answer is twofold. First any theory, when taken to extremes, risks becoming self-defeating. This is true even for utilitarianism, where the intricacies of predicting outcomes and weighing pleasures and pains can lead to undecidability. To avoid a regress to infinity, it is enough to stick to the practical dimension of deliberation. What is relevant or not for a decision in each situation emerges from the situation itself. One can potentially scrutinise every single motivation and every meta-motivation behind it, but it is also sensible to scrutinise when it is appropriate to stop in order not to arrive at an unfortunate state of immobility. Not all factors are always relevant and what might be critical in one scenario may be insignificant in another. Certain situations have an intrinsic quality that brings some aspects to the forefront at the expense of others. Recognising this situational relevance requires a certain responsiveness and flexibility in decision-making. There is a need to balance the emergence of the situation with general principles: although it is essential to analyse the vast network of potential consequences, decisions still need to be made. A middle way is therefore desired, in which decision-makers can recognise the determinants and scope of their choices without being paralysed by them. In complex situations, heuristic and rational methods may be useful, which, even if they fail to account for all nuances, can provide a structured path for decision-making.

## 5 Conclusions

This article highlights the dual contribution that enactivism can bring to the field of animal and environmental ethics. It is only a foray into the potential addition of enactivism to attempts to bridge the gap between holism and individualism. Although this proposal of enactivism is not without its critics, its strengths lie in its call for fluidity over rigidity and relationship over isolation. In the contemporary era, in which dichotomies often hinder progress and understanding, this reconceptualization could be, in our opinion, the bearer of important developments in the field of animal and environmental ethics. The essence of this discourse is not simply to propose a harmonised approach, but to question the very boundaries that have traditionally defined these fields.

The reconciliation between holistic and individualist values, although not directly addressed, emerges as an essential background to our discussions.

Central to our argument remains the application of enactivist suggestions to environmental and animal ethics, both as systems of data that can inform and influence the attribution of moral considerability and as constituent parts of the framework within which such attribution would take place. This last point represents a contact between enactivist positions that dealt with values as arising from the interactions and relations between a subject and the world (Fuchs 2010) and the 'relational' branches of ethics in environmental and animal contexts.

Inevitably these can only be suggestions and indications for possible future research, focused both on the formal aspect of this contribution and on its more concretely practical side. Here we content ourselves with indicating a path, hoping not to be the only ones to follow it.

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e-ISSN 2723-9640

**JoLMA**
Vol. 4 — Num. 2 — December 2023

# On the Genesis, Continuum, and the Lowest Bound of Selves

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**Abstract** In the history of philosophy, the concept of self has been perennially elusive. The philosophical quest to understand the self is rife with phenomenological and metaphysical analyses, often overlooking other kinds of selves present in the biological realm. To systematically explore this question of non-human selves, I categorize the literature on philosophical and biological notions of self into the biogenic, the zoogenic, and the anthropogenic approaches to self. This article attempts to chart the genesis, the continuum, and the lowest bound of the self. Further, I enumerate challenges in developing a biogenic approach to self or taking the concept of self all the way down in the phylogenetic tree.

**Keywords** Basal cognition. Biopsychism. Biogenic approach. Cognition. Mind. Self. Zoopsychism.



Edizioni Ca'Foscari

**Peer review**

Submitted 2023-06-16
Accepted 2023-11-07
Published 2024-02-07



**Citation** Joy, R. (2023). "On the Genesis, Continuum, and the Lowest Bound of Selves". *JoLMA*, 4(2), 243-270.

**DOI 10.30687/Jolma/2723-9640/2023/02/006**

## 1 Introduction

The concept of self is an unending philosophical conundrum. From 'no-self' theories to that of the 'minimal self', theories of self have multiplied, most of which are mutually incompatible. While the no-self theories assert that there is no permanent or autonomous self, the minimal self theories maintain that there is an immediate pre-reflective awareness of self. Varieties of no-self theories range from Hume (1739) to Metzinger (2004) to Buddhism, whereas Strawson (1999) developed the concept of minimal self, which Gallagher (2000) and Zahavi (2017) extended further. These notions of minimal self overlap with the theories of bodily self primarily expounded by Bermúdez et al. (1998), De Vignemont (2011), and others, as we shall see the concept of bodily self is central to the investigation of non-human selves.

In his paper *The Self and the SESMET* (1999), Strawson mentions around twenty-six different kinds of selves like the social self, the ecological self, the linguistic self, the verbal self, the narrative self, and the extended self – to mention a few. These theories of self are extremely diverse and differ in the context in which they are studied. For example, the notion of the social self proposes that an individual's conception of self results from interactions with others in society (Mead 2015). The ecological self, akin to the bodily self, defines the self in terms of an individual's situatedness and active relationship with the immediate physical environment (Neisser 1995).

On a closer examination of the above theories of self, we can identify a common thread connecting all of them, *i.e.*, the anthropocentric nature of such theories. Both realist and anti-realist theories (no-self theories) of self equally subscribe to anthropocentrism. For instance, Olson (1998) has identified a problem in defining the self. He remarked that for every answer to the question of the definition of self, there is another answer that is completely incompatible and unrelated. He underlined that in our attempt to define self from a particular point of view. There is a possibility that we undermine other valid views of self. Thereby, he points out the impossibility of achieving a unified conception of self and suggests abandoning the usage of the term 'self' altogether from our parlance.

What I find problematic in all theories that consider anthropocentrism as the norm in defining the self is their neglect of the possible notions of self in non-human organisms. This neglect certainly poses questions about species-chauvinism regarding selfhood, like: are there no other selves beyond that of the homo sapiens? Are humans the only privileged species to acquire selves among millions of other different species? Doesn't the existence of the self admit the question of origination? When and how did the self originate? Can we trace the origin of self to the origin of life? These are difficult questions to answer, and they emphasize the necessity to probe into the biological

nature of the self. If the notion of self is immune to the question of its biological and evolutionary origins altogether, then the presence of self in human beings appears to be an exception.

Moreover, at times, the impression of exceptionality lurks in conceiving the self as a non-biological entity altogether. On the other hand, if a better biological and evolutionary explanation of the reality of self is to be made available, we could systematically explore the possibility of non-human selves. This exploration of non-human selves will enable us to abandon species-chauvinism and conceive ourselves as a link in the great chain of the evolutionary continuum. Further, the question of the genesis of the self will aid in unravelling the possible existent selves beyond the human socio-linguistic horizon and physiology.

In this article, I will critically examine the autopoietic bodily conception of the self and the cognitive goal-directed approach to the self. Among all the different varieties of selves available to us in the anthropocentric literature of self, the most biocentric definition of self is produced by the school of bodily self, which treats the self as an embodied natural entity. Along with notions of bodily self, a novel cognitive goal-directed approach to self formulated by Levin (2019; 2022) helps to unravel the notion of self of different biological entities. Along with the bio-genesis of the self, this article will also probe the lowest bound of the self possible in the natural world and the life-self continuum[1] with reference to the bodily self and cognitive approach to self. I will begin the article with the history of the life-mind continuity thesis, which asserts that our mental traits evolved from other animals, like physiological traits. Other organisms possess mental traits as we do, but the complexity may vary from higher animals to lower animals. Then, I will classify different approaches to self based on their subject of study as the anthropogenic, the zoogenic, and the biogenic approaches to the self. Finally, since the article focuses on the genesis, the possibility of a life-self continuum, and the lowest bound of self, I will elaborate in detail on the biogenic approach and the models available within the biogenic approach.

I begin the discussion on non-human selves in section 2 by wading through the overarching philosophical theme of the continuity thesis. Subsequently, in this section, I will present a brief history of the thesis and its variations found in the literature, including that of weak and strong continuity thesis, zoopsyschism and biopsychism, and mind-life continuity thesis and the field of basal cognition and biogenic approach. **[Fig. 1]** juxtaposes the different varieties of the continuity thesis and the sub-varieties of the thesis. Section 3 of the article sketches the classical anthropogenic approach to self and brings

1 Similar to the life-mind continuity thesis, in this paper, I coin the term life-self continuity thesis. The life-self continuity thesis asserts that life is always accompanied by the self.

out the deep anthropocentrism rooted in classical theories. This section makes an argument for naturalism and picks out the bodily self from the anthropogenic approach as a starting point to ponder upon non-human selves. Section 4 introduces the zoogenic approach to self and the primary characteristics of this approach. Further, the section elaborates on reafference and how various thinkers extend this aspect of bodily self to accommodate non-human animals. Section 5 details the biogenic approach and basal cognition. Sub-sections 5.1 and 5.2 discuss autopoietic and cognitive models, respectively. Section 6 introduces another variety of self we find in literature, the technogenic self. **[Tab. 2]** plots all the different varieties of selves discussed in this article. Section 7 enumerates various challenges we face while developing a biogenic approach to self, namely that of the over permissivity in the cognitive model, the paradox of perspectival realism of self presented by the biogenic approach, and entangled concepts which form three types of the continuum: the cognition-life continuum, the cognition-self continuum, and the life-self continuum. Section 8 concludes this article by recapitulating the biogenic answers to initial questions, and **[Tab. 3]** tabulates answers. The article ends with a suggestion to furnish an empirically robust criterion for the self, which should be exclusive to biological organisms.

## 2 The Continuity Thesis and Its Variations

Before pondering upon the non-human selves, it is important to discuss the *mental status* of animals in traditional philosophy and the shift to the continuity thesis. The traditional accounts of the soul or psyche overlook non-human beings, like Plato's (Allen 2006) account in *The Republic,* which compared the irrationality of human beings with that of animals. In *On the Soul* and *Nicomachean Ethics*, Aristotle (2018, 2014) denied reason to animals.[2] St. Augustine (2009), in *The City of God*, maintained that animals exist for humans' sake, and in *Eighty-Three Different Questions* (Augustine 2010), writes that everything is made for man's use because man is bestowed with reason. Descartes, in *Discourse on Method* (1987), considered animals as mere automata since they lack the faculty of language and reason.

2 However, Aristotle's (1991) categories represented in the Porphyrian tree maintain that there is continuity in terms of his classification of categories, such as substance (extended type), a body (animate type), animal (rational type) human (particular type). Thinkers like Sorabji (1995) have argued that Aristotle considers animals to have memories, perceptions, desires, and emotions so hat they can be said to bear a mind. Again, in Aristotle's terminology, he marks that the soul is available to the category of animals (or, for that matter, any living thing), but the reason is ascribed only to humans. The ability for speech and reasoning characterizes the discontinuity in Aristotle.

Descartes also denied the capacity to feel pleasure or pain to animals. Smith (1963) termed this cartesian position as the *monstrous thesis*. Further, Harrison (1992) captured the essence of the cartesian monstrous theory by adopting Malebranche's words: "They eat without pleasure, cry without pain, grow without knowing it. They desire nothing, fear nothing, know nothing"[3] (Harrison 1992, 219).

Heidegger (1996) claimed that animals are world-poor (*weltarm)*. Heidegger restricted his usage of 'existence' to human beings, excluding animals and inanimate beings since they lack language and historicity. The accounts of St. Augustine and Descartes maintain that humans are uniquely and strikingly distinct from the rest of the living organisms. In other words, these accounts highlight the discontinuity in the evolutionary chain between humans and other animals. However, today, the study of cognition and mind is slowly abandoning this deep-rooted species chauvinism (Lyon 2006; Bekoff 2002; Griffin 2001) by studying different cognitive behaviors and acknowledging intelligence that lies beyond the peripheries of the human nervous system in different biological organisms. They maintain that there is mental continuity between humans and the rest of the beings. This continuity thesis explored by the current thinkers has a long tradition. It was Aristotle who propounded this thesis for the first time, and we can identify its lasting influence in the Romantics (Steiner 2005). Even before Darwin's systematic formulation of the theory of evolution by natural selection (1859), the idea of continuity appeared in the works of Hume (1739) and Darwin's contemporary Schopenhauer (1818).[4] The primary mandate of the continuity thesis is captured in the Darwinian dictum, which states that "The difference in mind between man and the higher animals, great as it is, is certainly one of degree and not of kind" (Darwin 1871, 105).

Further, the continuity thesis is found in the works of Spencer (1872), Haeckel (1892), Dewey (1929), Jonas (1966), Maturana and Varela (1991). The continuity thesis has two major varieties today: *zoopsychism* and *biopsychism*. Haeckel was the first to use both terms. He termed the inheritance of mind in every life form as biopsychism and zoopsychism as the notion that grants mind to only animals.[5] Further, the use of the terms appeared in the recent works by Godfrey-Smith (2016) and Thompson (2022). Thompson conceptualizes zoopsychism

**3** Cottingham (1978) challenged this classical interpretation of Descartes and remarked the monstrous theory is vague and ambiguous.

**4** During the second half of the 19th century, one may notice thinkers addressing the-continuity thesis largely inspired by their interest in Eastern traditions. Especially the notions which emphasize the interconnectedness of humans and the nature.

**5** Haeckel's (1892) tripartite categorization includes panpsychism, biopsychism, and zoopsychism. He subscribes to the philosophy of panpsychism rather than that of biopsychism and zoopsychism.

to recapitulate notions that attach mentality to animals or organisms with a nervous system. Likewise, drawing from Dewey and Spencer, Godfrey-Smith (1994) divides the continuity thesis into strong and weak continuity theses. Similar to biopsychism, strong continuity maintains that the "*mind is life-like*" (Godfrey-Smith 1994) and that the basic organizational properties of mind and life are the same. The weak continuity thesis, zoopsychism, maintains that everything that possesses a mind is alive, but everything that is alive may not possess a mind. Jonas (1966), with his philosophical biology, maintains that the process of metabolism gives rise to the primal aspect of the mind. This phenomenological variety of biopsychism proposed by Jonas, Maturana, and Varela was later subsumed under the neologism of life-mind continuity thesis. The life-mind continuity thesis later formed the crux of the Autopoietic Enactivist school[6] of 4E philosophy.[7]

The other modern variations of biopsychism are the novel and budding areas of basal cognition (BC) and the biogenic approach (BA). These areas provide us with a unique way to think about the mental capacity of different organisms. BC deals with the fundamental processes necessary to sustain the organism, including cell-to-cell signaling, bioelectricity, etc. These processes evolved long before the nervous system existed (Lyon 2006; Keijzer et al. 2013; Baluška, Levin 2016; Levin 2019, 2021, 2022; Lyon et al. 2021). BC treats these processes as cognitive in nature. BA to the mind starts with rethinking the philosophy of the mind from a biological perspective rather than from a psychological perspective (Lyon 2006). Both are rooted in numerous empirical studies with the philosophical quest to divorce the concept of cognition from its anthropomorphic veneer, which unraveled the astonishing mental capacities possessed by the inhabitants of the microcosmos. BA's fundamental presupposition is its commitment to mental continuity between humans and other living organisms (Lyon 2006). BA employs empirical data, whereas the life-mind continuity theory expressed in Autopoietic enactivist literature is primarily an ontological theory. The concept of autopoiesis is yet to gain empirical validation. Zolo, who is a critic of autopoietic theory (1990), writes that

> Autopoiesis does not designate any specific feature of biological phenomena and cannot be identified either with the reiterative cellular loop or with homeostatic mechanisms. Unity, autonomy, and "closure"

6 Autopoietic Enactivism brings enactivism and autopoietic theory together. Ward et al. (2017) define autopoietic enactivism as the theory that grounds cognition in the "biodynamics of living systems".

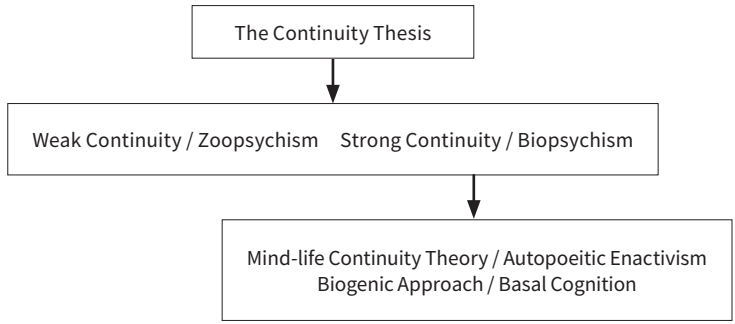
7 The 4E (Embodied, Embedded, Enacted and Extended) approach emphasizes the role of body, environment, along with brain in the act of cognition. 4E approaches question the central claims of classical theories of cognitive science like computationalism and representationalism. See Newen et al. 2018.

> are not empirical features. Rather, they are theoretical concepts synonymous with autopoiesis and self-production. (Zolo 1990,65)

Autopoietic theory has seen only limited success in the biological sciences. Scheper and Scheper (1996) elaborate on the tautological nature of the theory and claim that the theory is empirically untestable and lacks explanatory power. Escobar (2012) disagrees with Scheper and Scheper over the empirical nature of the theory, and he details other major issues with the theory, like that of self-referentiality.

Nonetheless, the continuity thesis and BA fall broadly under the 4E approach to cognition.[8] The BC and BA are the most empirically grounded variations of biopsychism. The primary focus in BA and BC remains on cognition; nonetheless, the literature covers the overarching themes in the philosophy of the mind. I will discuss more about BC and BA in section 4 of this article. **[Fig. 1]** plots the varieties of the continuity thesis in the literature.

**Figure 1** Varieties of Continuity Thesis




Unlike the concept of mind or cognition, the concept of self is more perplexing. Nonetheless, the thesis provides a framework to rethink capacities like cognition, agency, sentience, etc., which are traditionally considered to be exclusive to humans and argues that such capacities are ubiquitous in the biological world. With this framework in the backdrop, in the following sections, I will explore the continuity of self.

Even though there are scattered discussions on unconventional notions of self like that of the *immune self* (Chernyak, Tauber 1991;

8 Lyon (2006) points out that the biogenic approach can be accommodated under the 4E school. However, not all strands of thought in 4E are biogenic.

Tauber 1994) in the philosophy of biology,[9] a systematic exploration of the genesis and the phylogenetic continuum of self is a poorly explored area. In this article, I venture into BA, where we find latent thoughts about the self, pointing towards a life-self continuum. Along with BA, zoopsychist literature has also produced significant ideas on the concept of self in non-human animals. Drawing from Lyon and Haeckel, I classify these theories of self into three approaches, namely, as the anthropogenic, zoogenic, and biogenic approaches. This scheme will provide a course to organize numerous possibilities of self beyond human psychology. The following sections, 3, 4, and 5, will elaborate on these approaches in detail.

## 3 The Anthropogenic Approach to Self

The classical philosophical theories of self maintain a human-centric approach to defining the self. I term them as the anthropogenic approach to self. These anthropogenic approaches include the conceptions of self like that of the social self, the verbal self, the narrative self, etc., as mentioned earlier. In addition, this approach includes various aspects of self that are studied from a biological perspective in fields like psychiatry, where the concept of self is studied with reference to different psychopathologies (Saas 2001; Parnas, Sass 2003), but they still main human-centric approach to self. This human-centric approach is characterized by studying the self from phenomenological, introspective, psycho-social, linguistic, narrative, and theological perspectives from a first-person point of view.

The schools within this approach, like that of the social self, investigate the self by tracing its origins to society and *others*, whereas schools, like the linguistic self, examine the notion of the self within the paradigm of language and memory. Similarly, the narrative self presents a hermeneutical view and theological conception of self, theorizes the self as a metaphysical substance bestowed by a divine being, and so on.[10] At times, this approach leads to the denial of self or anti-realism regarding the existence of self,[11] as mentioned in the introductory section of this article. The anthropogenic approaches are often imbued with notions of human exceptionalism. Human exceptionalism is the notion that humans are superior to other animals.

9 The immune self refers to the inherent capacity of the immune system in an organism's body to recognize foreign elements entering the body. Thereby possessing a primitive ability to distinguish the self and the other.

10 For a detailed history of the anthropogenic self, see Barresi, Martin 2011.

11 In this article, I argue for the realist account of self. From a biological perspective an organism requires a form of unity or a form of organismal identity that can persist over time to ensure its survival.

For instance, Dennett (2017) attributes human exceptionalism to the unique role culture plays in human evolution. This view maintains that humans are different from other animals not in degree but in kind. These accounts altogether overlook the concept of non-human selves and ignore the evolutionary history of self. Various definitions of self provided by the different schools in this approach are too narrow and stringent. Extending these definitions beyond human subjects to accommodate different non-human agents would be a dead-end. For example, consider the Dennettian conception of narrative self (Dennett 1992), which involves autobiographical memory or autonoetic consciousness (Tulving 1985). Autonoetic consciousness is a kind of consciousness that involves an organism's ability to mentally time travel into the past and future.[12] According to the current consensus and empirical evidence, only *Homo sapiens* are bestowed with this unique variety of consciousness. Such notions of self are too narrow, which provides no space for non-human animals.

However, recent attempts to naturalize phenomenology by Zahavi (2010) and Gallagher (2012) are based on various empirical studies and phenomenological accounts. Naturalized phenomenology also considers the numerous accounts of the bodily self and the ecological self, which can aid us in thinking about the self in unambiguous natural terms and enable us to extend selfhood to non-human animals.

Therefore, I begin the quest to understand the natural history of self by analyzing the bodily self of the anthropogenic approach. The literature on the bodily self provides us with a unique *segue* to ponder upon the genesis and phylogeny of the self, which in turn compels us to examine novel ideas emerging from the philosophy of biology and cognitive science closely. While there are numerous phenomenological dimensions of bodily self within the anthropogenic approach, this article will primarily focus on the empirical perspectives that elucidate the concept of self embedded in an organism's physical body.

## 4 The Zoogenic Approach to Self

The bodily self is a non-dualistic and anti-transcendental account of self. This view maintains that the self is embodied, or in other words, the self is embedded in the human body. This notion of self highlights how bodily mechanisms like that of proprioception (Sherrington 1898) and reafference (von Helmholtz 1866) contribute to the awareness of self. Proprioception is a form of perception that provides information about bodily positions like the positions of muscles, limbs, etc. Therefore, proprioceptive awareness is treated as

12 It is closely related to the Bischof-Köhler hypothesis.

the awareness of one's own body that is extended in space. Reafference is the process where an organism perceives that the sensation it experiences results from its own bodily movements. It is often contrasted and juxtaposed with exafference, the process where an organism perceives that sensations are caused by the external world.

These conceptions of bodily self can be extended to include non-human animals, as such processes are not exclusive to humans. Within this framework of bodily selves, the pre-reflective bodily awareness (which arises from the bodily mechanism of proprioception and reafference) is often treated as self-awareness and self-consciousness. This intrinsic relationship between the bodily self and the self-consciousness is captured by Bermúdez (2011, 166) with the following premises.

1. The self is embodied.
2. First-person bodily awareness provides perceptions of bodily properties.
3. First-person bodily awareness is a form of self-perception.
4. Therefore, first-person bodily awareness is a form of self-consciousness.

In this argument, the deduction of self-consciousness from self perception is built on the premise that first-person bodily awareness contains certain aspects that are also forms of self-consciousness, like introspection and autobiographical memory. This implies that the first-person bodily awareness is self-specifying. Another aspect of the bodily self in the literature includes the bodily ownership or the sense of ownership and the bodily agency or the sense of agency. Bodily ownership is the "sense that I am the one who is undergoing an experience" and bodily agency is "the sense that I am the one who is causing or generating an action" (Gallagher 2000, 15).[13]

Such notions of self-consciousness and bodily self-awareness can be extended beyond the limits of human psychology and human physiology. The various aspects of the bodily self have been employed in studies of the non-human self in the past, like mirror experiments and self-recognition methods (Gallup 1970; Povinelli et al. 1993) of comparative psychology. These studies shed light on animals' capacity to recognize themselves in the mirror (here, the capacity of self-recognition is treated as an integral part of self-awareness). However, the mirror experiment had its own limitations; it could not accommodate

13 Gallagher (2000, 15) also conceives of this form of bodily ownership and bodily agency as two aspects of minimal self. Gallagher explains as the "basic, immediate, or private something" that remains after when all "unessential features of self" are stripped away. However, Gallagher underlines that the minimal self is dependent on "brain processes and an ecologically embedded body". Along with Gallagher, Strawson (2011) and Zahavi (2011) have articulated their versions of minimal self.

a wide variety of animals with varied senses and attention patterns. Considering the lack of success of various animals in mirror self-recognition tests, de Waal (2019) suggests that we should adopt a gradualist perspective on self-awareness. de Waal opines that our ideas of self-awareness are akin to the *Big Bang theory*: self-awareness came into existence out of nowhere. The Big Bang attitude to self-awareness still dominates the philosophical studies on self and cognitive sciences as well. These attitudes can be eliminated if we take into consideration various aspects of the bodily self.

Deeply rooted in phenomenology and ecological traditions,[14] the bodily self today takes center stage in numerous studies on the self in cognitive science. Further, the extension of bodily self to accommodate non-human selves can be seen in DeGrazia's tripartite classification of animal awareness (2009): Bodily Self-awareness, Social Self-awareness, and Introspective Self-awareness, which presents bodily self-awareness as the primary form of self-awareness. He remarks that every sentient animal possesses such bodily self-awareness. Bermúdez (2018) hints at non-linguistic and prelinguistic creatures possessing a nonconceptual point of view.[15] The work of Jékely, Godfrey-Smith, and Keijzer (2021) elaborates on the phylogenetic rendition of bodily self. They allude to the process of reafference to explain the concept of bodily self in animals with rudimentary nervous systems.

Neuroscientist Hendricks refers to this process of differentiating sensory inputs as the essence of sentience.[16] The concept of reafference and bodily self is also elaborated by Legrand (2006). The concept of reafference and corollary discharge appears in many naturalistic renditions of bodily self. Corollary discharge is defined as a pathway that allows animals to recognize their own actions (Sperry 1950; von Holst, Mittelstaedt 1950).

Further, Gallagher draws from Firth (1992) and explains the possibility of realizing his version of the minimal self with sense of agency and sense of ownership in neurophysiological terms of efference

**14** Neisser (1995) describes the ecological self as the self which can be directly perceived with reference to the physical body. Nonetheless, the works of ecological theorists (Gibson 1966; Neisser 1995; Rochat, Hespos 1997) focus more on ontogeny than phylogeny.

**15** Bermúdez (2018) explains that the nonconceptual point of view enables an organism to take a route to navigate its environment and to realize that its perception of the world is influenced by its activity of taking the route. Bermúdez highlights that the nonconceptual point of view has two principal components; nonsolipsistic and spatial awareness.

**16** Taken from Ed Young's *An Immense World* (2022). Young reports a personal conversion between Hendricks and him, where Hendricks refers to the process of reafference as the base of animal sentience.

copies[17] and comparator model.[18] However, these accounts remain silent on the prospects of bodily self in non-human animals and the applicability of the principle to lower organisms. Jékely, Godfrey-Smith, and Keijzer (2021) further extend the concept of marked reafference and the origin of bodily self to accommodate animals with nervous systems. They do not deny the primal form of self to unicellular organisms or organisms without a nervous system. However, they emphasize that non-neural animals are restricted to limited coordination and agency. "Their bodies, while materially unified, are not tied together as selves in the same way that a neural animal is" (Jékely, Godfrey-Smith, Keijzer 2021, 3).

Along with the reafferent principle and corollary discharge, they relate the origin of the complex bodily self to the origin of the nervous system. The bodily self models based on reafference underline how the self and the other distinction arose in the animal psyche or, in other words, how animals became aware of the physical reality of their own body and the external world.

I term the above account as the zoogenic approach to self, where the nervous system is treated as the epicenter of the self – the zoogenic approach to the self grants self to only animals and organisms with nervous systems. Given the significant developments in the area of aneural cognition in recent years and the argument pertaining to the ubiquity of cognition in all life forms, which I examined in section 2, I further suggest that we should not limit the definition of self only to animals with a nervous system instead we must explore the possible forms of selves in aneural organisms. Even though unorganized, there exists literature that points to the direction of the self-life continuum/the existence of self in every form of life. The present literature on aneural self warrants that we examine it closely and do not restrict ourselves to nervous-centric ideas of self.

Along with the zoogenic self, we can find many strands of thought in the literature that associate the self only with the human brain. These descriptions of the self are incredibly narrow. Moreover, the survey of various literature on the self and brain maintains that finding neural correlates of self in the human brain is highly improbable (Vogeley, Gallagher 2011). Given all this, we must look beyond the zoocentric approach to self. In the next section on the biogenic approach, I will focus on how the concept of self can be understood in aneural organisms or organisms without a nervous system.

17 Efference copies are the copies of the efferent signals that are sent from the brain to efferent organs. These copies aid the process of reafference. It is also speculated that the efference copies play a key role in consciousness, see Vallortigara 2021.

18 Comparator model is the theoretical model for action control. Proposed by Frith (1992), the model includes numerous components like feedback loops, predicted state, desired state, etc.

## 5 The Biogenic Approach to Self

The quest for understanding the genesis of self takes us to the emerging areas of basal cognition. In basal cognition, numerous empirical studies question the uniqueness of the nervous system (Lyon 2006; Levin 2019, 2020; Levin, Keijzer et al. 2021; Lyon et al. 2021). Here, I mark the need to distinguish the definitions of the zoogenic approach from BA. Zoopsychism, the overarching idea of equating the genesis of self or mind or cognitive capabilities with the emergence of the nervous system, challenges the continuity thesis of life in the mind. Zoopsychism falls under the paradigm of the weak continuity thesis of Godfrey-Smith. Zoopsychism proposes that there was a sudden awakening of biological beings into the light of sentience with the evolution of the nervous system. This classification between neural and aneural understanding of mind, cognition, and self is missing in general accounts of BA. However, this classification is better fleshed out in the works of Thompson (2022) and Godfrey-Smith (2016). BA is a bottom-up approach that calls for a Copernican revolution in the study of the mind (Lyon 2021). Any theory that builds on the principles of biology is part of BA (Lyon 2006). BA asks us to revisit our methods of understanding the mind and cognition. It is the family of approaches welded together by relevant themes and motivations (Sims 2021). It is an explanatory framework that treats cognition as a biological function, a set of mechanisms that enable storing, processing, and acquiring information at any biological level (Lyon 2006), including that of the subcellular level (Baluška, Levin 2016).

Similarly, BC primarily deals with aneural organisms, a research field furnishing astonishing data on unicellular organisms' cognition. This notion of cognition without the brain, especially in unicellular organisms, is scattered throughout the scientific literature. Darwin (1880) and his son Francis were the first to propound the root-brain hypothesis, the idea that the root-apex of plants functions like a brain. Likewise, Timsit and Gregoire (2021) maintain that Binet, Jennings, Loeb, and Gelber initiated 'neuron-free neuroscience'. Goodwin (1977) was the first to use the term 'cognitive biology'. Bray (1995) claims that cytoskeleton filaments and ribosomal protein networks in cells mimic different functions of neuronal networks. Kondev (2014) makes an astonishing statement that the E. coli cells exhibit free will. In addition to this, the cellular basis of consciousness by Reber (2016), plant neurobiology and plant cognition by Calvo Garzon (2007), Baluška and Mancuso (2009), Garzón and Keijzer (2009), Calvo and Trewavas (2020), and so on bring out numerous cognitive capacities of microbes and plants. These claims form a significant part of BC and BA literature today.

BA is further categorized into the self-organizing complex systems theories (SOCS) and the autopoietic theory of Maturana and Varela

(1980). Self-organizing systems theories highlight the connections between thermodynamics and cognition, and autopoietic theories underline the intrinsic relation between living and cognition (Lyon 2006; Sims 2021). BA deals with cognition and mind, we find latent schools of thought on the self within the BA. I term them the autopoietic model of self and cognitive model of self. The autopoietic model of self highlights the emergence of the bodily self embedded in the process of autopoiesis, and the cognitive model presents a functionalist account of the self. These models provide us with the likely candidates for the lowest bound of the self in the biotic world and possibly will shed some light on the genesis of the self.

## 5.1 Autopoietic Models of Self

Autopoiesis was coined by Varela and Maturana (1980, 1987, 1991) to answer the question of life. It serves to distinguish life from non-life. The etymological meaning of autopoiesis is *self-producing*. Primarily, autopoiesis was theorized as the process that explains the intrinsic interrelated nature of life and cognition. An autopoietic system is considered a self-organizing and self-producing system. An autopoietic system has a boundary. The boundary generates reactions inside the boundary, and the reactions inside the boundary determine the boundary. This cyclical network of reactions enables the demarcation of the 'self' and the 'other'. Autopoietic theorists maintain that this cyclical logic (Luisi 2003) is the basis of life, and it gives rise to the 'self' at a cellular level. Therefore, autopoietic theory entails that the self is an invariant of life. The theory also maintains that living itself is a cognitive process. A living system's interaction with its environment is treated as cognition in the autopoietic framework. A similar account of boundary and self can be found in the early work of Dennett (1989). Further back in history, the idea of self-organization and life was explored by Kant in the *Critique of Judgement* (1987). The literature on Autopoietic enactivism (Weber, Varela 2002; Barandiaran et al. 2009; Froese, Di Paolo 2011) takes the life-mind continuity thesis as its central theme and discusses different fundamental aspects of self with the processes of sense-making (Weber, Varela 2002), adaptivity (Di Paolo 2005), etc. Sensemaking is better explained with the example of a bacterium moving towards the sucrose-rich gradient; this movement represents the significance that the organism attaches to its external world or environment. The process of sense-making brings forth the world to the organism. Further, adaptivity is defined as an organism's struggle to maintain its organizational integrity, and this process renders the organism a form of individuality and identity.

Thompson captures the concept of bodily self and cognition encapsulated in the autopoietic theory via sense-making with the following propositions:

> Life = Autopoiesis and Cognition.
> Autopoiesis entails the emergence of the bodily Self.
> Emergence of Self entails emergence of world.
> (Thompson 2007, 158)[19]

Another account of self was proposed by Glasgow (2018), wherein he articulated the account of the minimal self in unicellular organisms with the three conditions of *intrinsic reflexivity*, namely self-maintenance, self-reproduction, and self-containment. Glasgow maintains that for any organism to attain minimal selfhood, it must fulfil all three conditions. The condition of self-reproduction is Glasgow's addition to the autopoietic theory of Maturana and Varela's theory. In contrast, Maturana and Valera maintained that self-maintenance/self-organization is ontologically prior to self-reproduction. Nevertheless, Glasgow's theory also falls under the autopoietic framework since it is based on the autopoietic theory. Autopoietic models consider a single cell as the lowest bound of the self. Despite ample work produced on the theory of autopoiesis, it still remains as a theoretical framework for understanding life, self, and cognition. Contrary to other strands within the biogenic approach, the autopoietic theories lack robust empirical findings to validate the mechanism of autopoiesis in living systems. A single cell is a complex system with thousands of interconnected molecular networks; from what kind of networks the autopoietic reactions emerge is still an unanswerable question.

## 5.2 Cognitive Model of Self

A cognitive account of the self emerges in the recent writing of Levin. Levin's biogenic approach theorizes the concept of self in functionalist cognitive terms. Unlike the autopoietic theory, the cognitive model of self is deeply rooted in novel empirical findings. Empirical findings of unconventional modes of intelligence and the incredible

19 However, Thompson does not subscribe to this notion of autopoietic bodily self. Thompson maintains that "it seems unlikely that minimal autopoietic selfhood involves phenomenal selfhood or subjectivity, in the sense of a pre-reflective self-awareness constitutive of phenomenal first-person perspective" (Thompson 2007, 162). In his recent work *Could All Life Be Sentient?* (2022) Thompson again raises similar concerns. However, the proponents of autopoietic enactivism use terms such as 'point of view' while explaining the concepts of sense-making which distinctly highlights the involvement of subjectivity in this process of sense-making (Kee 2021).

ability of various non-neural entities to navigate different morphological problem spaces form the bedrock of the cognitive self. Unconventional modes of intelligence include forms of bodily intelligence embedded in somatic cells, such as the memory of muscle cells. Levin draws from James' (1981) test for minimal mentality and elaborates on how cells display collective intelligence during the process of morphogenesis (Levin 2023). He maintains that intelligence is ubiquitous in biological systems. The classical parameters of intelligence, like problem-solving, memory, and decision-making, are not bound to the nervous system. These attributes of intelligence are exhibited in genes in cells to organs in a biological system, and to non-living entities (Levin 2021). Levin defines the self as "a coherent system emerging within a set of integrated parts that serve as the functional owner of associations, memories, and preferences and acts to accomplish goals in specific problem spaces where those goals belong to the collective and not to any individual components" (Levin 2022, 40). He maintains that this definition can accommodate different kinds of selves – minimal, complex, artificial – cells, organisms, humans, machines, etc. The boundary of the self in this account is malleable. The self can expand its boundaries and dissipate into smaller selves in a biological system. The expansion and dissipation of self in the cognitive account sets it apart from autopoietic models, where the boundary conditions define the system, and the boundaries are not flexible like that of the cognitive model.

Further, he proposes that selves can be classified by a spatiotemporal scale and by the type of goals they can pursue. Levin terms this notion of self as the "Cognitive Light Cone Theory of Self". The light cone theory of self advocates for a continuum of selves that ranges from simple to complex to artificial. Complex selves, like humans, can think beyond their present time and space. They transcend their mere needs – such selves are concerned with climate change and the life of stars, etc. In contrast, simple selves, like those of ticks, are concerned about nothing more than food, and their goals are limited, immediate, and not complex, like that of the human species.

The complexity of cognition is also defined by the complexity of goal-directedness, which in turn defines the different degrees of selves. He terms this approach as TAME- *Technological Approach to Mind Everywhere* (Levin 2022). This approach is concerned with recognizing minds across the spectrum or studying mind-as-it-can-be.[20] Levin explains three foundational aspects of TAME: first, its commitment to gradualism. Second, a substrate-independent-functional approach to self and agency; and third, conceiving the mind, the self, and the agent as engineering problems. Its radical commitment

**20** Adopted from Artificial Life's motto: life as it can be.

towards gradualism takes the concepts of cognition, mind, and self *all the way down* to the subcellular level. Self is substrate-independent, which can be realized in biological and non-biological systems. Levin also maintains that the distinction between the life and non-life organism and machine is redundant. The engineering treatment offers a different paradigm to view agency, mind, and self in an experimental framework, thus taking these concepts beyond the intricacies of philosophical debates. Hence, this approach maintains goal-directed machine is also a kind of self. With this account, Levin provides a unified theory of self with a simplistic apparatus to grade the different varieties of possible selves.

## 6 The Technogenic Approach to Self

The technogenic approach to self is the extension of the continuum of self. The approach extends the concept of self to non-natural, artificial, and technical entities. The primary variety of the technogenic self is the robotic self. The robotic self comprises humanoid robots engineered to mimic different aspects of the anthropogenic or the zoogenic self. Tony Prescott and iCub[21] have been working on robotic selves; their research focuses on selves in humanoid robots engineered to mimic various aspects of anthropogenic selves. Prescott and Camilleri (2019) detail their fascinating work in progress with a control architecture called distributive adaptive control or DAC (Verschure et al. 1992; Verschure 2012), which can generate different varieties of anthropogenic selves like the ecological, the extended, the interpersonal, the conceptual and the private self in robots. Studies on the robotic self often take insights from developmental psychology and developmental robotics (Hafner et al. 2020). Furthermore, Hafner (2019) probed the robotic self with Gallagher's minimal self model.

Further, in Takeno's (2012) work, the mirror recognition experiment explores the robotic self. This debate leads us to the possibility of artificial minds, artificial phenomenal consciousness, etc. It warrants us to examine the intricacies of technopsychism closely. A full-fledged detailed survey of the robotic self is beyond the scope of the article. However, we must note that both autopoietic and cognitive models can be extended to accommodate various technogenic selves. Technogenic selves are often an extension of anthropogenic, zoogenic, and biogenic selves. In **[Tab. 1]**, I juxtaposed the landscape of varieties of selves discussed in the paper.

**21** iCub robots are humanoid robots that resemble a three-year-old child. iCub robots' cognitive capabilities are scaffolded using principles of embodied cognition.

**Table 1** Different Approaches and Models of Self

| Approach | Models | Definitions and mechanisms | Subjects of the study | Definitions and Criteria of self |
|---|---|---|---|---|
| Anthropogenic | The Social self,<br>The Verbal self,<br>The Narrative self,<br>The Minimal self,<br>etc. | First-person perspective,<br>psychosocial structures,<br>language,<br>Brain process, etc. | Human | Different models explain the self with different definitions. |
| Zoogenic | Reafferent models of the self | Reafference | Animals | Animals with marked reafference possess the bodily self. |
| Biogenic | The Autopoietic model of self<br>The Cognitive model of self | Autopoiesis<br>Goal-direct-ed cognition | Biological entities<br>Non-biological entities and biological entities | The process of autopoiesis gives birth to the bodily self.<br>Goal-directed cognition is treated as the hallmark of the self. |
| Technogenic | Robotic model | Mimicking various aspects of other approaches. | Non-Biological entities | Realization of various aspects of anthropogenic and zoogenic selves are taken as the criteria of self. |

## 7 Challenges in Tracing the Natural History of the Self

There are various challenges associated with unravelling the natural history of the self. This section will enumerate the significant hurdles. Nonetheless, the list is not exhaustive.

### 7.1 All Too Permissive

Fred Adams' charge against the biogenic approach to cognition in his paper *Cognition wars* (2018) is that the approach makes cognition all too permissive. The continuum of cognition lacks a strict criterion that can demarcate cognition and non-cognition. The concept of cognition is extended so much that the concept itself becomes redundant. The

concept of self in the cognitive model faces similar issues. Diluting the criteria for self makes it so permissive that almost anything and everything can qualify as self. Consider Monod's claim (1970)[22] that the goal-directed activity of proteins is cognitive, and goal-directed activity being the criterion for self in the cognitive model, and it eventually creates a self-bloat.[23] This takes us to something similar to panpsychism about the self. The self in biological systems appears to be unique and different from that of non-biological entities, possessing a kind of intrinsic inwardness. Here, we need to investigate the uniqueness of biological selves. The plot of a unified theory of self fails to capture the nuances of the inwardness of self in biological entities. Just as di Primio et al. (2000) captured the essence of the challenge of over-permissivity in minimal cognition with the phrase, "seeing cognition everywhere is virtually equivalent to seeing it nowhere in particular", in the context of the biogenic self, it can be said that seeing the self everywhere is virtually equivalent to seeing selves nowhere in particular. The cognitive model is also not biological in nature, and it does not underline any biological principle; instead, it provides a framework within which we can locate the selves of the biological entities.

## 7.2 The Paradox of Perspectival Realism

Both schools maintain that we can find selves at different levels of a biological entity, from cells to organisms. However, at the same time, it is also true that we experience a single unified self. This question of a single unified self has divided philosophers over the ages. The question gave birth to different realist and anti-realist accounts of the self in the history of philosophy. The biogenic approach renders perspectival realism about selves. The self exists; multiple selves exist within a given system. A single prominent self exists from the perspective we look at it. The unified complex self we experience, which connects the organism with its environment, is real from our frame of reference. The complex selves of anthropogenic philosophers do exist from the organismal lens, which dissipates when we look closer into the biological system of the organism. All cells in our body have selves, then different systems like that of the immunological system in our body work like a self, but somehow all work together to form a single unified self which we experience in our day-to-day life. Cancer is an example of

**22** Levin (2021) maintains that a minimal degree of goal-directedness is present in particles.

**23** Self bloat is loosely adopted from cognitive bloat objection against the extended mind hypothesis. The objection states that supersizing mind would inevitably lead to the whole world being a part of mind. Similarly diluting the concept of self would inevitably lead to the position that everything possesses a self, thus creating a self bloat.

the cell-self dissipating from the system and acting without regard to the system. Cancer cells replicate and propagate themselves selfishly, disregarding and endangering the host system (Levin 2019). Each biological system possesses a Russian doll model of self. The unified self dissipates when one looks at a biological system through a microscopic lens. Varela addressed this point with the neologism of meshed selves or the "Selfless Self" (1990), and Levin (2021) christened this problem of the unified self as the dark matter of cognitive science.

## 7.3 Entangled Concepts and the Continuum Theses

The models within the biogenic approach fail to provide classifications or distinguishing criteria or definitions for the self, cognition, and life. The autopoietic school maintains that life=cognition=self. The properties that define minimal life, minimal cognition, and minimal self are the same. The cognitive model treats goal-directed cognition as self. These entangled concepts often lead to cyclical fallacy and equivocation of terms like cognition, life, and self.

Nevertheless, these entangled concepts of the biogenic approach give three types of continuum theses:

The cognition-life continuum
The cognition-self continuum
The life-self continuum

The cognition-life continuum: both autopoietic and cognitive models maintain the cognition-life continuum. However, cognition can happen without biological life in the cognitive model. The cognitive model is a functionalist model of the self. Functions are substrate-independent. Therefore, cognition can be realized in non-life, non-biological systems. The cognitive model maintains that life always accompanies cognition, but cognition does not always accompany life.

The cognition-self continuum: both models maintain the cognition-self continuum. The cognitive model scales different kinds of selves based on goal-directed cognition. Conversely, the autopoietic model treats life, self, and cognition as a set sharing the same properties. Both models maintain an implicit relation between cognition and self.

The life-self continuum thesis: both models maintain the continuum of life-self. Nevertheless, the cognitive model entertains the possibility of the genesis of self and cognition prior to that of life. The concept of life remains dispensable in the cognitive model, opening up the possibility of the genesis and evolution of self and cognition prior to life. Therefore, within the biological realm's periphery, the cognitive model maintains a weak continuum, *i.e.*, life always accompanies self, but self need not accompany life.

The autopoietic model entails that autopoiesis is the essential property of the concept of life. From autopoiesis, self-organization and self-distinction arise, which define the bodily self. The autopoietic model maintains a strong continuity between self and biological life, *i.e.*, self always accompanies biological life, and biological life always accompanies self.

## 8 Conclusion

To unravel the questions of genesis, lowest bound, and the continuum of self in this article, I ventured into the biogenic approach. In it, we found two models that present us with two different answers. In the autopoietic model, the genesis of the biological self is traced to the genesis of the biological cell. Whereas in the cognitive model, the genesis of the self remains ambiguous. The autopoietic model's lowest bound of the self is a single cell, whereas in the cognitive model, again, ambiguity prevails. The autopoietic model maintains a strong life-self continuum, whereas the cognitive model maintains a weak one. **[Tab. 2]** recapitulates the biogenic positions on these fundamental questions.

**Table 2** Genesis, Lowest Bound, and the Continuum

| | **Autopoietic model** | **Cognitive model** |
|---|---|---|
| *Genesis* | Along with the cell | Ambiguous |
| *Lowest bound* | A single cell | Ambiguous |
| *Self-Life continuum* | Strong continuum | Weak continuum |

Defining the self and pondering the genesis, the continuum, and the lowest bound of self is a riveting research field. However, defining the concept of self and scrutinizing the biological processes that give rise to the self in different organisms is an uneasy task. We also find incommensurability of selves in the literature. Every approach provides different models to observe the self.

In this article, I searched for the genesis, the continuum, and the lowest bound of self to unearth the varieties of selves available within the phylogenetic tree and the necessary processes involved in giving rise to self, mainly from biogenic and zoogenic approaches. The article provides a landscape of various approaches to self and details numerous drawbacks of each approach. Drawbacks include anthropogenic approaches being extremely attenuated and zoogenic approaches failing to account for the genesis of the primal self. The biogenic autopoietic model is more of a theoretical approach which is yet to furnish strong empirical evidence to validate the theory. Moreover,

the cognitive model makes the concept too simplistic and permissive. To facilitate the study of the self in BA, we need to furnish a mark/criterion for the primal self. The mark of self must be a robust criterion backed by empirical evidence and a process or mechanism that is unique to biological systems. This criterion will help to distinguish the self from the non-self and eliminate the drawbacks of the current models. However, such a definition must not be too anthropogenic or zoogenic, limiting the concept of self only to our species or organisms with the nervous system. We must steer our quest to discover a unified biological theory of self that can capture the evolution of the self in the light of novel empirical evidence. The approaches and the models classified in the article are a humble attempt to inaugurate a new field of study that deals with the evolution of the biological self.

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e-ISSN 2723-9640

**JoLMA**
Vol. 4 — Num. 2 — December 2023

# Extending the Concept of Cognition and Meta-Theoretical Anthropomorphism

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**Abstract** How to deal with the controversies surrounding applying the concept of COGNITION to non-humans? I suggest a bottom-up approach that makes room for the pluralistic perspectives of non-human cognition researchers without disregarding philosophers' worries about overextending the concept. My proposal is that COGNITION should be a holistic story, in which no part can be understood without the context of the whole. If such a project is to succeed, however, we need to deal with anthropomorphism – not of the well-known, superficial kind, but understood as a deeply embedded framework determining how we understand cognitive life in general. After explaining what this kind of meta-theoretical anthropomorphism is, I argue that investigating non-human cognition is the best way to make explicit many of our hidden assumptions and re-examine them. In the second section of the paper, I present how this approach can be effective in reconsidering Brandom's proposal of how to define levels of concept use for the purposes of empirical research on non-humans.

**Keywords** Plant cognition. Animal cognition. Concepts. Extending cognition. Anthropomorphism.



Edizioni Ca'Foscari

**Peer review**

Submitted 2023-10-02
Accepted 2023-12-04
Published 2024-02-07



**Citation** Białek, M. (2023). "Extending the Concept of Cognition and Meta-Theoretical Anthropomorphism". *JoLMA*, 4(2), 271-288.

**DOI 10.30687/Jolma/2723-9640/2023/02/007**

## 1 Introduction: The Plants are not the Problem – We are the Problem

There is an implicit assumption made in the debate about COGNITION,[1] and especially in what Akagi (2022) aptly calls the "border wars" concerning the limits of what this concept could be applied to. This assumption is that COGNITION is a "human" concept, that its primary use is to describe something humans engage in, and that this is something we know. For example, whenever criticisms are made that whatever plants do, could not be called "genuine" cognition (and see Allen 2017, for a great response to such criticisms), the background assumption behind such criticisms is clearly that "genuine" cognition is something humans, possibly only humans, are capable of – it is also implied this is something more complex, more advanced. The very Call for Papers for this Special Edition encouraged authors to examine the consequences of "de-humanizing cognition", which strongly suggests that cognition is originally something applicable to humans. It is common to accuse scientists and popular authors of "anthropomorphising" whenever they employ COGNITION (and related terms, such as 'intelligence' or, above all, 'consciousness') to non-human beings. This strong tie between concepts such as COGNITION and being human is also reflected in the fact that research applying them to non-human animals is often used to back educational and political efforts to promote animal and plant welfare.[2] When we are confronted with headlines that "plants are capable of some forms of cognition", we usually think this means they are more "similar to us, humans" than we used to think. All this contributes to the impression that "human cognition" is something we grasp relatively well; it is *stretching* or *extending* the concept of cognition to apply it to other beings that is difficult. Moreover, the difficulty increases the farther we move away from humans along the evolutionary tree.

However, the reality of philosophy and cognitive science is quite different. As Colaço (2022) observes, the debate on COGNITION and

1 Following other authors, I use capital letters to refer to the concept of cognition.

2 One of the most poignant examples of this is the reception of the "Cambridge Declaration of Consciousness" (Low et al. 2012), which has been met with great enthusiasm by animal activists and lobbyists, and has been referred to by supporters of many legislative changes promoting animal welfare. One of the most significant passages of the Declaration states that "Convergent evidence indicates that non-human animals have the neuroanatomical, neurochemical, and neurophysiological substrates of conscious states along with the capacity to exhibit intentional behaviours. […] *humans are not unique* in possessing the neurological substrates that generate consciousness. *Non-human animals*, including all mammals and birds, and many other creatures, including octopuses, *also possess these neurological substrates*" (emphasis added). The declaration itself focuses on the neural substrates, but the popular reception put emphasis on consciousness *simpliciter*.

related concepts is fuelled by dissatisfaction which is "not about these concepts not applying to plants. Rather, it extends to applying these concepts to humans and other animals". This observation – that there is a deep problem with understanding "human cognition" – can shed more light on all three conceptual objections to applying COGNITION to plants pointed out by Colaço: 1) that "plant cognition" does not mean the same as "human cognition"; 2) that we do not need a concept implying "energy-expensive mental states" or a "representational dimension" or "doing things for reasons" in order to explain what plants do, and 3) that mere information processing is not "the mark of the cognitive", because COGNITION should involve meaning, and, specifically, representational processing, including the capacity to misrepresent. All three criticisms hint at various qualities typically ascribed to "human cognition": above all, intentionality, the involvement of internal representations that are at least partly independent of the external world (can be false), and the connection between cognition and action. Cognition should be a source of "reasons" for beliefs and decisions. Moreover, cognition is an action in itself, controlled and performed because of certain needs.

It is worth noting that all those features are extremely complex from the point of view of philosophy of mind, have historically been the subjects of the most heated debates, and those debates are still far from being resolved. Although the mainstream approach in cognitive science remains representational, new views have been introduced, especially within the 4E (embodied, embedded, enactive, and extended) paradigm and predictive processing, that shed a very different light on the nature and the role of representations in human cognition. Radical 4E approaches suggest that we can explain *human* cognition largely without referring to internal representations (cf. the ideas of radically embodied cognition offered by Chemero 2009 or Hutto, Myin 2013) who claim cognition can be explained largely without any reference to representational content). The extended mind hypothesis emphasises the role of external representations rather than internal ones. The predictive processing models of aspects of cognition are easily interpreted in a nonrepresentational way, or at the very least change the way we understand representations (cf. Williams 2018). Those paradigms, however, are typically criticised for not being able to explain those same "advanced" features that are, purportedly, the essence of human cognition – for example, there are doubts whether predictive processing models can account for abstract contentful representations, such as thoughts (Williams 2020) and the more radical non-representational ideas have met with fierce objections (cf. for example, Miłkowski's 2015 attack on Hutto, Myin 2013 or Kirchoff's 2011 general arguments against radically antirepresentational trends in the 4E paradigm). At the same time, both the 4E paradigm (the concept extended cognition in particular – see,

e.g., Parise, Marder 2023) and the predictive processing paradigm can be successfully applied to plants (Calvo, Friston 2017). When Allen (2017) discussed possible worries that a pluralistic view on COGNITION could harm the effort to create a unifying paradigm in cognitive science, the implicit reason for that was that overextending the concept to include simpler forms of cognitions would be the source of problems. It seems, however, that no less than two new paradigms in cognitive science that offer hopes for a unifying perspective are hampered not by plants, but by humans.

I think, therefore, that it might be wise to stop thinking in philosophy of "de-humanizing" COGNITION and of "extending" it from humans to plants – rather, we should change our perspective and worry about extending COGNITION from the most basic instances to humans. Naturally, the idea that we should build our theory of COGNITION from the bottom up is not new – it has been proposed both by more biologically oriented researchers, such as (Lyon 2006) and (Levin et al. 2021), and by more speculative, Hegelian philosophers working within the 4E paradigm. I am referring here to the concept of "participatory sense making", introduced in De Jaegher and Di Paolo (2007) and developed in Di Paolo et al. 2023 to describe the continuity between simple life forms and the advanced linguistic capabilities that humans boast. I would like to propose, playing on the Hegelian intuitions behind Di Paolo and colleagues' (2023) project, that we should treat the concept of COGNITION as a story. It is both a story that is still happening in the evolutionary life of our planet, and a holistic narrative. The earlier chapters, concerning the simplest organisms and their forms of interacting with the world, have to make sense in the context of the later chapters which concern human cognition. The later chapters can't be understood without the knowledge of what happened before. The story is not always strictly coherent; many inconsistencies, subplots, brilliant twists, and blind alleys may occur. The narrative is not strictly linear. We don't know, how it ends. For some of us, it begins with life itself, like for Stewart (1995), others will still seek the perfect spot to place their "bookmark of the cognitive". However, everything that happens in the story is a necessary, indispensable part of what COGNITION is. Among the empirical researchers there are, and should exist, many strategies to tell this story or different parts of it. This view is not in contradiction with proposals introducing universal, highly malleable and applicable notions of COGNITION such as the modular definition put forth by Akagi (2022), Lyon's concept of minimal cognition (Lyon 2020), Keijzer's concept of cobolism (Keijzer 2021), and the programme of investigating basal cognition (Lyon et al. 2021). From the practical point of view, maybe it is even alright, as Allen (2017) suggests, if COGNITION is not strictly defined at all. I am also sympathetic to the pluralistic idea of various definitions of COGNITION as

a way of hypothesising about it (Colaço 2022). My only philosophical constraint is that we should think of COGNITION as a story that needs to be told in whole, from the beginning to where it is now, with the awareness that it is not ending with us. Specifically, we should not try to skip to the human chapter and define COGNITION in a way that grasps only the complex forms of cognitive activities humans engage in. If we have a philosophical stake in what is special about human cognition, we should be all the more eager to investigate the origins of cognitive processes even in unicellular organisms. In fact, we should embrace the chance to do so as this is the only real chance of achieving our goals.

And my metaphor of COGNITION as a story will serve me well to present the argument why this is our only chance: because of the narrator. In the following section, I will show that humans as narrators of the COGNITION story are prone to different levels of anthropomorphising, and that there is an important, meta-theoretical level that deserves our special attention. I will describe how we can work on challenging the meta-theoretical anthropomorphic assumptions with the help of research on non-human cognition. In the last sections of the paper, I will use the case study of Brandom's philosophical reconstruction of what our ability to use concepts entails (2009) to show how this strategy can work in practice.

## 2 The Narrator and the Levels of Anthropomorphism

Of course, so far, humans have been the narrators of the COGNITION story. This has at least two important consequences: first, that they are telling this story for human purposes, cognitive, ethical, and political, focusing on the human chapters; second, that they are themselves shaped by this story in a very particular way. As for the first consequence, I do not intend to debate whether this is right, wrong, or just inevitable – I simply acknowledge this special yearning to understand our own cognition and the reluctance to accept all the possible consequences of undermining our special status. I would like to focus on the second aspect, which concerns the often-discussed fact that COGNITION itself is an anthropogenic concept. It is a concept created by humans, a particular species of animals engaging in cognition in their particular way, and the concept's original purpose was to describe this way. Those are two good reasons why the use of COGNITION outside of the human realm can be criticised as "anthropomorphising", but I think the first one – the fact that the authors of the concept of COGNITION are in fact only engaging in a special form of cognition without fully realising their constraints – is much more interesting and has much deeper consequences.

Let me elaborate. In Białek 2023, I have distinguished three layers of anthropomorphising in our research on non-human animals (and, presumably, plants). The first layer is cognitive – it's the level of semi-automatic categorizations performed by our minds and based in all the heuristics and simplifications that make our everyday life with humans easier. My example of this type of anthropomorphism was the real-life story of how people tend to instantly interpret the smile of Ham the chimpanzee who was photographed before being sent in space, as a sign of positive emotions, although we now know from ethology that in reality it probably expressed fear. The second layer is narrative – it's the level of the narratives in which we explicitly ascribe complex psychological (and typically human) phenomena to non-human animals. In my example, observing the smile led to a (blatantly false) conclusion that the chimpanzee had been proud of what it was about to accomplish. The crucial level I wish to discuss here is intermediate: it's a deep, meta-theoretical anthropomorphism. In order to understand what I mean by this last kind of anthropomorphism, we need to observe that layer one semi-automatic perceptions shaped by our sub-personal systems can only fuel reflexive, layer two narrations if there is a background framework or theory linking phenomena like smiles with conjectures about someone's sense of pride. In general, we can identify this intermediate theory as folk psychology, but I need to underline that it is anthropomorphic to a much deeper degree than it is typically recognised. In the discussed case, it is not only simply interpreting smile as a sign of pride that is anthropomorphic. The whole deep structure of this narrative, how evaluative states, physical behaviours, and beliefs are combined into a single story about an individual engaging with their world, is based in our human experience of the way those states, behaviours, and beliefs influence each other in our lives as human individuals. As humans, we have a particular way of understanding how cognitive states can work, what purposes they serve, how they influence and are influenced by other kinds of activity, as well as the environment. This deep structure organises our whole story of COGNITION in ways that may not always be apparent to us. Discovering this structure may be called a Kantian endeavour.

I maintain that this kind of Kantian approach to anthropomorphism can be interpreted optimistically, as Kant's epistemology sometimes is: we can explore those underlying frameworks, and this process gives us the most important and useful kind of knowledge. I believe this is right, but that it also requires a conscious effort. The perfect way to become aware of the deep anthropomorphic structures framing our story of COGNITION is, however, not to stick to our anthropomorphic comfort zone, but, quite contrariwise, to challenge everything that seems so obvious to us. The surprise offered by the exciting insights about plants, creatures so different from

humans, can help us see clearly what is special about our cognition on a deep, structural level. It is as if a Kantian epistemologist could investigate aliens whose basic forms of intuition were different to our Earthly space and time.

In a similar vein, Nanay (2021) has suggested that we could reverse our anthropomorphic tendency and adopt "zoomorphism" as a philosophical explanatory paradigm, attributing mental states observed in non-human animals to humans. Nanay's proposal sounds truly refreshing, as it consciously ignores the fact many authors (such as, for example, Wynne 2004; 2007), would claim that just to identify a "mental state" in a non-human animal is already anthropomorphic (and possibly unfounded). Nanay's proposal is practical and simple in its essence: the history of cognitive science teaches us that investing animal cognition has often brought us interesting insights about humans – one of his examples being, quite ironically, given the context of this paper, discovering internal representations in rats by Tolman. It is tempting to go even deeper, denounce the zoocentrism of this approach, and call for explanatory *phytomorphism*, attributing to humans the mental states we begin to be finding in plants.

However, I believe that we need to first address the worry about the inevitable and inherent anthropomorphic starting point – and we need to address it head-on. We have to be on the lookout for what we bring to the table when interpreting and examining non-human animals and plants – luckily, the explanatory phytomorphism and zoomorphism paradigm is the best way to discover what this is. We could say that, ultimately, this is the idea of examining the deeper anthropomorphic assumptions behind the way we study our own minds and our own cognition; in order to be able to set them aside.

Two instant objections spring to mind. The first one is that this approach to COGNITION seems strongly anthropocentric – the way I presented it would seem that our ultimate goal is to explain cognition in humans, just as it always used to be in classic cognitive science, and that all the research on non-human animals, plants, and any other cognitive organisms is only an instrument to achieve this goal. It is well known, by now, in cognitive ethology, that this kind of anthropocentric attitude is often detrimental and stifles true scientific curiosity about other species (for brilliant methodological reflections on this topic see (De Waal 2017; De Waal, Ferrari 2010). To this first objection my answer will be twofold because the problem has at least two levels. The first level has to do with our scientific purposes, motivations, and focus – to put it simply, the reasons why we write the whole story, and which chapters interest us, ultimately, the most. As I already stated, the holism of the story-like understanding of COGNITION has to work both ways. We need the plant chapters to understand the human chapters, but we also need the human chapters to shed light on the plant chapters, put them into perspective.

From this point of view, humans are actually instrumental to finally get to know plants. Second, and this is the part of my answer that addresses the deeper level of the problem, this approach acknowledges that our perspective is inevitably anthropocentric. We cannot ever authentically and intuitively phytomorphize – had I been a plant, I probably would not be writing this paper right now. This, however, is also the reason why we need to examine our anthropomorphic assumptions, and in order to do so, it is necessary to also focus on human cognition. Again, we can think of research on human cognition as instrumental to discover what may be our deeper assumptions about the rest of the living world.

The second instant objection has to do with another old sin of traditional cognitive science: an assumption of linearity and the still prevalent way of speaking about human cognition as simply "superior", "more advanced", "more complex", which also results in the tendency to seek out in other creatures some "primitive versions" of what we claim to possess, or only focusing on the development of certain capabilities we deem essentially human. The safeguard against this kind of linear ideas would be the strong emphasis on plurality and openness not only to similarities, but also to differences. The old, linear view was grounded in older, simplified views on evolution, and the fundamental changes in how we now understand the complex, both convergent and divergent processes are perhaps enough to help with this worry. There is, however, again a deeper danger which has to do with the Hegelian origin of the intuition that concepts such as COGNITION are stories. The danger is that the desire to build a holistic, coherent story will overshadow attention to any difficult, troublesome details that may feel out of place. It has often happened in philosophy, that an elegant, general, universal theory enticed authors to begin twisting facts to make them suit the perhaps oversimplified idea. A true Hegelian would even say that whatever does not suit our story, does not exist at all, which, if interpreted at face value, must sound abhorrent to an empirically-oriented reader. Moreover, if we take the Hegelian inspiration too literally, we might again fall into the trap of trying to build a linear story, forcibly seeking out dialectic triads in whatever empirical research we encounter. This is obviously not something anyone would want (not even a true Hegelian). There is no sure way to prevent this from happening – philosophers are naturally inclined to hunt conceptual patterns, to propose general views, and to synthesise, and this is what drives our project to write the story of COGNITION. We can only keep ourselves aware of the danger and treat any overly simple, general, too smooth explanations as a possible red flag. Our story has to be cohesive, but whenever it is turning out to be straightforward, perhaps we should pause and re-examine our anthropomorphic assumptions. As humans attempting to understand other creatures in a non-anthropomorphic way, we

should expect things to be difficult, not obviously coherent, and problematic for our deeply embedded psychological frameworks. Those difficulties can breed fuller understanding of them, and of ourselves.

In the second part of this paper, I would like to present an example of how my ideas about re-examining our deepest anthropomorphic assumptions in the light of the emerging research on plants can be put to work. I will be considering the brilliant, Fregean reconstruction of the structure of concepts proposed by Brandom (2009) as a toolkit that analytic philosophers possess and should have offered to cognitive scientists, including researchers of non-human cognition (who are explicitly mentioned numerous times throughout the paper). Brandom's story is not meant to recount the evolutionary development of cognitive powers – he unveils the logical and semantic structure of concept use, not its empirical history – but it has been developed with a view to guide empirical research on cognition. My goal is, therefore, obviously not to undermine the logical reconstruction with empirical arguments, but to bring out some of the deeply anthropomorphic elements and show how they can be given a broader, "phytomorphic" perspective.

## 3 Brandom's Logic of Concepts

Brandom's main thesis is that the ability to "use concepts" is complex. In fact, there are three main stages or levels of "concept using" that can be achieved (and Brandom credits mainly Frege with the discovery of those stages). The three stages are hierarchically structured – each one is a development of the previous ones and, as Brandom states, no individual could achieve a later stage without first completing the preceding ones. First, let me note that although Brandom refers specifically to concepts and not COGNITION in general (the paper was, no doubt, intended to help the debate on concept possession in animal cognition research), this does not confine us to more advanced forms of cognition in any way. Quite the contrary: we start our story with ways of interacting with the environment that are accessible to a chunk of iron. This makes Brandom's work a good candidate for a case study in meta-theoretical anthropomorphism in building our story of COGNITION, as it truly is meant to start "all the way down" (and go "all the way up").

We begin with the Aristotelian and Early Modern intuition that the essence of COGNITION is to classify. To get to know things is to know what categories they belong to. In this tradition, classifying is associated with constructing judgments of the shape "x is F", where x's were concrete, specific things and Fs were categories or general concepts. However, as Brandom observes, simple acts of classifying only require differential responsiveness, of which even a chunk

of iron is capable: it can 'distinguish' wet environments from non-wet ones by rusting in some of them and not in others. The next small step involves sentient awareness of the response and grouping those sentient responses into kinds, which means shifting from "sentience" to "sapience". This kind of categorizing, still deeply embedded in the Aristotelian tradition, has been seen as the essence not only of COGNITION, but of what constitutes a consciousness. Now, when we seem to get relatively advanced, comes the first big twist in our story: gaining the ability to not only label, but describe. To describe, putting it simply, is to be able to understand what the meaning of our categories is. The brilliant way of testing this is to build an implication, in which our judgment that "x is F" is the antecedent. "If 'x is F', then…" what? If we grasp, which consequences would be correct and which not, it means that we grasp the meaning of "F". Interestingly, Brandom's working example here is a parrot, which can be taught to label red things as red, but which, as he assumes, can't describe the empirical content of this concept, best defined as its inferential consequences. I will leave aside whether it is empirically true about parrots that they could not grasp, for example, that "If something is red, then it is not green", although it is in itself instructive how today, 14 years of intense research on non-human cognition later, an assumption that might have seemed obvious in 2009 may raise questions. According to Brandom, even if they are only labelling and not describing, we may still ascribe them the ability to use concepts, in order "not to be beastly to the beasts" (Brandom 2009). We just have to be careful not to confuse this ability with the more advanced forms of concept use. There is a suggestion here between the lines, that most experiments investigating categorization and concept use in non-humans are not differentiating those two levels of the ability to conceptualize clearly enough.

The next big step on our way is gaining the ability to distinguish the empirical content from the pragmatic force. Among the consequences of our conceptual classifications, there are not only inferences expressing the content of our concepts, but also the pragmatic consequences of the very fact that a classification is made. The best way to distinguish those two kinds of consequences is, again, to embed simpler sentences as antecedents of conditionals. There is a difference in pragmatic force between things we assert ("This is red!") and the unasserted antecedent of a conditional (such as "If this is red, then"…) or between "This is red" and "I suppose this is red". Our content becomes an ingredient, something that can be negated or otherwise manipulated to build more complex constructs. It is important for our purposes to grasp that this stage brings the ability to distance oneself from the empirical content, to adopt different epistemic attitudes toward it, and to use it reflexively.

The last stage involves creating complex concepts, Fregean functions, which grasp that what is invariant under substitution of some sentential components for others. Brandom encourages us to think of complex concepts as "patterns", the essence of how the simple concept applies to its terms. The mechanism here seems technically and formally complex, but it is ultimately a reiteration of what happened at the previous stage: we gain the ability to manipulate the concept in an even more abstract way, introduce another dimension into our concept use.

## 4 5a "Phytomorphic" Commentary on Brandom

The first comment that springs to mind from the "phytomorphic" point of view is that this distinction of levels is actually not as helpful for researchers of simpler forms of cognition as we could hope. The "level one" ability of labelling is very simple, especially that we are given the example of an inanimate object also passing the "basic classifying" test. It is too general, given the diversity of creatures that could be ascribed this ability and all the different ways it is instantiated. However, Brandom himself offers us a way out: he makes it explicit that focusing on "classifying" as the essence of cognitive activity, is part of our philosophical heritage. This makes it exactly the kind of deep methodological anthropomorphism we should reexamine in the light of our budding knowledge of other creatures.

The traditional focus on classifying blinds us to a fascinating issue that might be explored with the help of what we have learned from empirical research on animal, plant, and uni – and multicellular forms cognition: who is doing the classifying. In our deep meta-theoretical anthropomorphism we automatically identify the agent engaging in cognition with the narrator of our COGNITION story. This may be partly why in Brandom's story, we are dealing with clear-cut individuals, even in the case of the chunk of iron. The intuition that categorization is performed by a coherent individual belongs to our deeply anthropomorphic framework of understanding cognition. There is an implicit assumption of a strong border between a well-organized, coherent being, that encounters something in the external world and reacts to it as a whole. In the anthropomorphic view of cognition, there is always a stable "self", even if we consider subpersonal processes or inanimate subjects.

The perfect way to challenge this assumption (and, in doing so, to understand it better) is to delve into the realm of plants. Although we tend to anthropomorphically see plants as similar to humans, highly centralized, possessing both tools for communicating with the environment and internal organs which are shielded from it, we already know that their modular structures and organs work quite differently.

As Parise and Marder (2023) emphasise, although plant modules have enough internal connections to allow for physiological coordination, each module is far more independent, also with respect to its communication with the external world, than in the case of animals. Parise and Marder emphasise that plants are much less isolated or even distinguishable from their environments than animals, as all their life takes place "on the surface" and involves "non-plant actors". They could not qualify as a self even according to minimal conceptions, such as the body-self (Jékely et al. 2021), which is unified by reafferent sensing, neural control and morphology and enables the animal to act as a single, coherent unit. They have to be considered something tantalizingly "in-between". They are sessile – but also in some cases capable of some coordinated movement. They often comprise parts that extend far into the environment or exist in two different realms at once, partly underground, and partly on the surface. They lack neural structures – but they have chemical ways of communicating, both internally and externally. In some cases, they may be considered a self in the sense proposed by (Levin 2019), who encourages us to demarcate "selves" "by a computational surface – the spatio-temporal boundary of events that it can measure, model, and try to affect", which he imaginatively dubs "a cognitive light-cone". Levin's idea of "Scale-Free Cognition" allows us to see both a unicellular organism and a human society as individuals pursuing goals "at an appropriate level of scale and organization". However, in case of plants, it would turn out that what we instinctively qualify as an individual plant does not always form a single "cognitive light-cone". Parise and Marder even view plants as "nodes in the field of extended cognition which exceeds their embodied limits" (2023).

This glance into the complexities of plant "selves" is not intended to undermine the very idea that there is a "self" in cognition, or rather: that there has to be a coherent individual behind doing the classifying. It encourages us, however, to explore the different "selves" in cognition that may or may not be coextensive with what we intuitively pick out as individuals. In particular, this can change the philosophical understanding of human cognition, furthering several ideas already introduced by the proponents of the 4E paradigm, such as distributed cognition, and treating the whole body as a cognitive agent. Research on basal cognition encourages us to consider every cell in the human body as cognitive, and, although our internal structures are much more integrated than a plant's, we may expect, following (Levin 2019), to find a multitude of "selves" in our cells and organs, as well as such "selves" that extend beyond human individuals, into the realm of institutions and societies.

This insight into the complexities of selves, including the human selves, may also shed light on the first big twist of concept use: the leap between labelling and describing. The example Brandom

chooses to explain this difference is not independent of certain background assumptions, or rather: of a traditional vision of the human self. Philosophers studying concepts traditionally tended to focus on acts of cognition that are relatively rare: acts performed by theoretically inclined beings whose interest in their surroundings is purely scientific. In philosophical accounts of concept use, there are subjects who judge whether something is "red" or "grivey", but there is usually nothing immediately important about this issue. We might say that those subjects represent the most disengaged, theoretical version of the human "self" – which perhaps overshadows for philosophers the reality of our everyday, regular selves. In real life, it is extremely rare that we engage in categorizing things as red or non-red just for pure, cognitive fun (at least beyond the age of two). It is more common that we scan the environment for red things, because we need our red wallet. Or we check the colour of the lights to know if we can cross the road. Our mundane, embodied selves perform cognitive acts to satisfy their simple needs. Although many theories coming from the 4E paradigm have offered more task-oriented views of cognition, the idea that genuine human cognition involves building disengaged, abstract judgments seems to be still prevalent. At the core of Brandom's reconstruction of the logic of concept use lies the idea of distance, the distance we can put between ourselves and the content we manipulate in increasingly abstract ways. It is important to notice that using the example of an abstract judgment, and not a simpler, task-oriented categorisation embedded in a concrete interaction with the environment is equivalent to introducing another, hidden step. For humans, the theoretical difference between simple but abstract judgments of colour and simple task-oriented judgments may seem negligible – but we should be more cautious when approaching non-human cognition.

If we try to search for disengaged, theoretically inclined selves in other animals or plants, we might indeed fail. Perhaps, despite my doubts, it turns out to be empirically true that a parrot could never grasp the concept of "red" at the level of describing and not purely labelling. However, if we consider the concept of "danger", it is much easier to agree that a parrot can draw the required consequences. "If x is dangerous, x can harm me" – sounds like an implication many non-human animals could be capable of forming and understanding. My point here is not to make a direct empirical claim about parrots or any other animals (as Brandom surely was not making one) – rather, to show that sometimes deep anthropomorphising takes unusual forms. In this case, it lies in tacitly assuming a traditional philosophical view of the human "self" and overlooking a step on the way of distancing ourselves from contents.

There is another anthropomorphic idea entrenched in this reconstruction that requires attention: that of sentience. Brandom openly

wishes to abandon referring to "sentient awareness" as it is a concept that proved to be difficult to naturalize, preferring purely information-oriented accounts of reliable classificatory dispositions. The goal is to grasp how external stimuli elicit reliable classificatory responses. Putting aside the traditional concept of sentient awareness, however, does guarantee that we get rid of the general, implicit assumption behind it: that sentience is a uniform phenomenon. This assumption is reflected in the fact that on this account, we do not speak of any important differences between the ways certain stimuli are encoded. However, if Godfrey-Smith's (2019; 2020) ideas about differences between sensory and evaluative consciousness or Veit's (2023) reconstruction of the dimensions of consciousness are right, we could say that this view of sentience is actually anthropomorphic. In the case of humans, it happens that sentience involves both sensory perception and assessment in terms of value, tied together in an inextricable bond. According to authors such as Godfrey-Smith or Veit, different dimensions of consciousness have actually evolved independently. If this is so, it may be that classifying may also be performed differently by different organisms, and there is a whole range of different conceptual abilities to consider. This does not undermine the validity of Brandom's logical reconstruction – but it does change how we view its empirical ramifications.

My final "phytomorphic" remark is an idea for future research, concerning the stage of cognition when we reach Brandom's second "big twist" in conceptual abilities: distinguishing empirical content from pragmatic force. In the traditional approach, the ability to adopt different attitudes, epistemic and otherwise, towards content is connected to the emergence of subjective perspective. The ability to grasp the difference between the consequences of "If I believe that x is F, then…" and "If x is F, then…" brings the ability to understand that we have a unique epistemic perspective and that others may have a different one. Representationalists would claim that this stage involves the conscious manipulating of internal representations. I would call this the subjective dimension of human cognition, something traditionally oriented philosophers seem to strongly value and perceive as "genuinely" human. The capability to adopt different epistemic perspectives lies at the core of how we test for having Theory of Mind, which has become one of the main avenues of research in non-human mental abilities. Again, this picture is painted with a specific, background philosophical idea of a unified, coherent "self" with its single perspective and single subjectivity. I believe that research on simple organisms and plants with their radically different, public, and extended cognition can and should inspire our thinking about subjectivity not only in the direct way, in that it promises to present us with an evolutionary story of how subjectivity emerged and developed. It can also force us to reconsider how our own subjectivity truly works in our

own instances of extended cognition, and how we merge the private and public epistemic perspectives of our different selves.

## 5 Conclusion

The starting point of this paper was that, despite what may seem, human cognition is far more problematic for philosophy and cognitive science than applying COGNITION to simple organisms and plants. I propose to take on board the pluralistic and universalistic ideas about COGNITION offered in the recent subject literature – and use them to challenge, re-evaluate and deepen our understanding of traditional philosophical ideas about human cognition. I argue that there is a deep, meta-theoretical anthropomorphism in our theorizing about COGNITION which cannot be eliminated but can be fruitfully re-examined. This can only be achieved with the help of the insights gathered by researchers on non-human cognition. Building a holistic, coherent story of COGNITION entails that what we learn about plants makes us understand humans better, but in researching them, we cannot lose our assumptions about human cognition out of sight.

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e-ISSN 2723-9640

**JoLMA**
Vol. 4 — Num. 2 — December 2023

# Do Willows Really Weep? Cognition, Its Grammar, and the Problem of Pluralism
## Conceptual, Linguistic and Metascientific Disagreements in Recent Science

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**Abstract** This paper will serve two functions. First, as a foreword to the other essays that compose this monographic issue of the journal. It will also provide a critical discussion on two major issues that emerged in the general. The first consists in seeing the philosophical outcomes of new developments in science through the lens of the language that is used to describe them. The second pertains to the metascientific level of the disagreement, as this new evidence challenges the established understanding of scientific practice and its philosophical foundations. The case of plant cognition will be examined in some detail to illustrate both issues.

**Keywords** Plant Cognition. Metaphilosophy. Ontological Turn. Pluralism. Philosophy of Mind.

**Summary** 1 Introduction. – 2 What Is At Stake? Framing the Disagreement. – 3 Science, Language, Interpretation. – 3.1 The Metascientific Argument. – 3.2 A Different Kind of Knowledge. – 4 Conclusion: Pluralism in Language, Pluralism in Science.

Edizioni Ca'Foscari

**Peer review**

Submitted 2023-12-31
Accepted 2024-01-10
Published 2024-02-07



**Citation** Batisti, F. (2023). "Do Willows Really Weep? Cognition, Its Grammar, and the Problem of Pluralism. Conceptual, Linguistic and Metascientific Disagreements in Recent Science". *JoLMA*, 4(2), 289-306.

**DOI 10.30687/Jolma/2723-9640/2023/02/008**

## 1 Introduction

This monographic issue of *JoLMA* collects seven engaging papers by authors who have quite different backgrounds. Nonetheless, they managed to provide readers with many reasons why philosophers who do not necessarily specialize in philosophy of mind should care about contemporary developments in the field. The main reason is that here we are dealing with a virtuous example of philosophy as a discipline having a two-way conversation with other sciences: a place where one can, and will, influence the other. While this issue has not attracted contributions from scholars in empirical sciences, my persuasion is that the papers that constitute it are readable and useful for that portion of audience, too. An example of this is the in-depth survey by Joy (this issue) on the notion of 'self' throughout several traditions between science and philosophy.

However, the strong philosophical core is represented by Figdor (this issue) and Colaço (this issue), who both tackle the fundamental question that inspired this collection: given that a relatively loose usage of 'cognition' is catching on in the empirical sciences, should philosophers hamper this trend – on the assumption that the extended usage has become too liberal and thus less informative? Or, rather, is this a good chance to rethink the original extension and intension of the notion,[1] putting under scrutiny another anthropocentric concept? This is indeed the connection Terragni and Cesaroni (this issue) make with ethical and political issues. It is not enough – they argue – to endorse a multi-species (or even one that includes non-animal entities) justice within the old anthropocentric construct of legal personality, to begin with. A change in ontological claims without a deeper revision of the actual structure remains merely cosmetic: asymmetries in power and social inequalities will persist untouched.

I – along with the two authors – believe that a discussion like this is motivated by philosophical insights, in its essence. Long-standing definitions are revised because strong interpretations are given of pieces of evidence. Sometimes the old definitions are defended. All that is ordinary philosophical negotiation. At the same time, a good part of it perfectly belongs to political theory. But what makes it even more interesting is that Terragni and Cesaroni speak directly to philosophy as they focus on the "risks in *theorizing*" (emphasis added). This is a case in which theory has a tangible reflection with worldly affairs. In other words, while philosophical reflection on nonhuman or 'more-than-human' rights and agency are key to a revision of societal inequalities, such as the environmental ones, an even more radical action is required to get us closer to an effective change in

1 "Cognition" is, by definition, human cognition. Cf. Figdor 2021.

the state of things. At this point, according to the authors, the ball is back in philosophy's court.

Białek's paper (this issue) is situated precisely at this stage. Her metatheoretical reflection is surgical in making philosophers question how many layers of anthropocentrism are there when they write on these matters. Her provided answer is that even following the cognitive reading of nonhumans one should gain awareness of the presence of a deeper level of anthropomorphism in their theorizing. According to Białek, this presence is ineliminable: after all, we are human and our perspective as such cannot be erased for good – and it should not. However, our anthropomorphic core in *theoresis* does not invalidate our philosophical efforts of revising the relevant traditional notions. On the contrary, once it is acknowledged, there is room for fruitful investigations in cognition across humans and nonhumans.

Akin to Białek's and Terragni and Cesaroni's reflections, Raffaetà (this issue), an anthropologist, traces the origins of the environmentalization of the notion of 'intelligence' back to cybernetics, considered not only as an academic line of research, but also as a cultural movement borne out of a specific historical climate in the global West. In complementary resonance with Białek's caveats, she detects that the most recent de-humanizing trends in philosophy and other disciplines sometimes act as if adopting those environmental-oriented theoretical positions could make good on the more foundational Western approach to nonhumans. Which, to be clear, has been ultimately detrimental to what (or should I say 'who'?) is not human. Raffaetà follows Povinelli (2021), according to whom a similar kind of blame could fall on an early advocate of a rethinking of the mind in ecological terms: Gregory Bateson. Similar operations are both not entirely honest with themselves with regard to the layers of anthropocentrism in which they are still immersed and, on the other hand, unaware of the cosmetic – that is, null – progress in material terms they allow for the nonhumans. Raffaetà's conclusion is that "ontoepistemological claims" (in a word, philosophizing) on the becoming of "cognition" toward its present environmental understanding "cannot be disentangled from sociopolitical and historical considerations". These theories are grounded in the way the West has been doing science and, in anthropological terms, how science has "decide[d]" what "to do with this alterity". The latter is at times the classic alterity between human communities, but includes the encounters with "more-than-human" entities, that prove to bring a kind of otherness just as "radical".

Along the same lines, Fizzarotti's contribution (this issue) shows that philosophical theories are in direct connection with their practical consequences when embedded into normative systems. That remains true for disruptive approaches to psychology like enactivism, which presents itself as a strong alternative to the hegemonic

disembodied cognitivism in the sciences of the mind. Enaction holds relational views of organisms in their environment and provides novel possibilities for developments in environmental and animal ethics. But, again, there are metatheoretical caveats to take into account if one aims at tangible changes.

## 2 What Is At Stake? Framing the Disagreement

All these papers display relevant connections in the sense highlighted so far. Namely, in a case like this, where the features of fundamental beings and entities with whom we share our same planet are discussed, come from and return to what happens outside of academia. Even abstracted conceptual dissections in the analytic style can provide crucial contributions. At the same time, the aforementioned approach to these questions cannot deceive itself into restricting its scope to an overly serious scholarly game of definitions – in fact, much that happens in philosophy today could be described in this way.

The papers in the issue also raise critical questions about how we are to frame those connections and the discussion itself. I will elaborate on two of those questions, namely, the linguistic aspect of the de-humanization of cognition and the metatheoretical conclusions that should derive, for example, in terms of theoretical pluralism. The two issues, I will argue, can be treated relatedly.

Figdor isolates the problem of pluralism: why can't people in cognitive science and philosophy be at peace with the fact that instances of cognition have been retrieved in non-animal systems? A clash in definitions seems inevitable, on these premises, in as much it is physiological. Given that our starting point to study the mind is our human mind, it is hardly surprising that claims about cognitive processes in plants or bacteria easily sound, at first, as categorial errors, pure and simple. It is worthy noting that the choice of human cognition as the origin for the definition of cognition need not necessarily be, even though good reasons in favour of the intra-species studies are, one could say, self-evident: the advantages, for instance, of relying on linguistic reports from studied subjects are clear.

This is also the sense in which this monographic issue concerns the "de-humanization" of cognition. Again, cognition, historically, started out as human cognition. It is only in relatively recent times that more and more scientists have started using cognitive terms – that is, terms that implied an original reference to something happening in a human person – in non-conventional ways (Figdor 2018, uses the expression "unexpected domains"). I use "non-conventional" to express the same idea: that *conventionally* nobody, and scientists in particular, would say that bacteria or plants 'prefer' without being metaphorical, hyperbolic, ironic, informal, etc. This can be said in as

much as word meaning is believed to work through conventions. So, the linguistic aspect both informs and reflects the views on theory.

A further step is wondering whether proponents of the cognitive features of, say, plants do that because they hold a strong claim of continuity[2] between human minds and plant minds and, thus, aim at pooling both kinds of mind in one group. Or, rather than 'one' group, the *only* group that there should be: single cognitive capacities that can come in different 'mind packs', that is, depending on the species. Alternatively, the proponents could be pursuing a 'honorific' (see Colaço, this issue) conclusion: calling a phenomenon that is traditionally considered not cognitive 'cognitive' is a catchy way of drawing attention to it, for the sake of discussion. In the end, we might be facing a liberal use of words that turns out to be metaphorical.[3]

A problem is that it is not always, or even not often, clear which of the two strategies[4] the proponents are adopting. 'Massive' ambiguity defines the field, according to Fidgor. That blocks answers with regard to talk of pluralism in the study of cognition, as a state of pluralism "implies that different investigative orientations can co-exist in relative peace for the most part" (Figdor, this issue). Instead, the status of non-traditional uses of 'cognition' is hybrid, at the moment, as is its desirability. One, I argue, could ask oneself how strong of an interest have people in plant cognition toward well-supported claims with regard to receiving (or taking for themselves) the label of 'cognitive' in the traditional sense. One could wonder how important that achievement would be, and for what reasons. It might not be such at all, as the 'honorific' interpreters seem to claim. Still, those unconventional usages abound. To dismiss them as either a mere self-branding strategy or an incautious treatment of loaded philosophical terms could be close to the truth in sporadic cases,[5] but leave something important out of the picture.

2 The continuity can be interpreted as functional, under the classical functionalist framework in the philosophy of mind: cognitive is what cognition does, in a slogan. Otherwise, one can defend stronger versions of the continuity that imply an ontological commonality in the physical support among different kinds of mind. This characterization is distinct from the one presented after, even though they overlap.

3 With regard to the differences between metaphorical and literal interpretations, I refer to Figdor 2018, as she writes: "When Das Gupta et al. (2014) write that fruit flies *decide*, and when Hubel and Wiesel (1962) write that neurons *prefer*, a popular initial response to these unexpected uses is that they are intended metaphorically. The Metaphor view claims that the uses make sense […] but aren't literal". An illustrious antecedent is Sellars (1991, 12), who defines "a metaphorical extension of the term" 'habit' the description of an earthworm's behaviour within a lab experiment, on the semantic premise that it is humans that have such a thing as a habit.

4 To clarify, I am not hereby claiming that these two options are the only possible ones.

5 Machery (2020, 682-3) seems to suggest that, even though this is not a central point among his remarks. Traditional plant biologists make that point more often (see section 3.1).

So, why do the de-humanizers of cognition walk down the comparative road? Let's consider Legrenzi's (2023) framing of the situation. Since it comes from a sideway place (the author is not involved in this kind of research but shares one problem with it), I find it useful for the sake of discussion. There, the disagreement is put in terms of reductionist versus non-reductionist approach to the matter. The first position considers only the animal mind to be *a mind*. This view is reductionist in so far as it automatically discards diverging ones as forms of unscientific thinking: metaphorical at best, or, in the worst case, even magical. For instance, Bianchi and Castiello (2023, 349) suggest that the insistence on calling plants "intelligent" and some of their capacities "cognitive" is to be interpreted as a reaction to what Legrenzi calls the a priori reductionist view. A sort of bidding war, I may add.

Being an expert in the psychology of economics, Legrenzi observes that such a rigid dismissal seems not to be elicited in the case of entities like the stock markets, to which (or should one say 'whom'?) are attributed properly cognitive features, like memory, learning, adaptation to stimuli, or even the expression of a 'sentiment'. Why does an undoubtedly loose application of folk psychology concepts like that go unnoticed? Legrenzi's answer is anthropological: we, as a species, do not feel threatened by the attribution of psychological powers to entities like markets – perhaps because laypeople do not understand them enough, if at all. Plants, on the other hand, are way more familiar in everyone's experience. For this reason, the differences with animals that have brains and, arguably, minds, are clear, and we want them to remain so.

I take these notes to allow a conclusion that may sound paradoxical. Even though – as Legrenzi reports – the naïve epistemology used to refer to the behaviour of stock markets is very much real for experts, its liberal use of a psychological lexicon is considered acceptable. On the contrary, caution is generally advised when it comes to plants. I would like to add another reason for this attitude. Since markets are ill-defined, abstract, unpredictable entities even for those who make a living out of them, the use of cognition-related terms is more easily considered metaphorical – or non-literal anyway. Perhaps, using metaphors is a desperate attempt to grasp some sort of understanding of these strange beasts. The same lexical and conceptual application to plants are immediately interpreted as serious proposals, in most cases. I mean that both in the academic usage and in the everyday one, such as when parents teach children not to severe flowers because "they would feel pain". An argument that usually wins the empathic reactions of children.

However, one of my first encounters with the topic (Gagliano 2022) represents a case that complicates my own conclusion in this respect.

## 3 Science, Language, Interpretation

For a novice of the unconventional views on plants, Gagliano's book, can be described as unsettling. I use this adjective as a *vox media*. In reading, I was upset as much as I was challenged in my views. Steadfast in a disenchanted view of the history of science – according to which discoveries, ideas and innovations in their scientific and intellectual merit are often the product of personal histories and multifarious contingencies around the people who made them – I was far from expecting some cold analytic treatise, embellished by a handful of anecdotes, as it often happens with books that try to popularize academic findings in the least unengaging way.[6] However, the complete easiness displayed by Gagliano in telling her story of a (struggling) scientist being inspired by plants, did exceed my expectations. More precisely, its most notable feature is the continuity between the explanations of ideas, experiments and results on the one hand and, on the other, the recounting of how some specific trees, for instance, talked to Gagliano (2018, Chapter O; 2022, 38-41) guiding her research, sometimes acting as prophets – or, rather, as academic supervisors. This striking unapologetic attitude cannot but elicit reactions in every audience. The narrative dimension of the book – replicated in interviews and other loci – is simultaneously so far-fetched and yet so genuine that the academic reader has a hard time presenting the two-way dilemma that one should expect at that point: either relegate such a narrative to a sugary, obnoxious "magical realist" dimension (cf. Legrenzi 2023, 406), or just embrace it without reservations.

Gagliano proves to be above and beyond a similar scientistic ideology. While in many pages my first reaction was to pop my eyes out in disbelief in front of the odd mixture of fascinating laboratory experiments (that became peer-reviewed scientific articles) and soul-changing trips on the trail of future-forecasting talking plants, I concluded that a harsh dismissal would have been uncharitable and underwhelming on my part. At the same time, I find it very reasonable to methodologically separate the scientific merit of findings on the behaviour of plants from the narrative around it. A truism I find useful as a remainder is that the vast majority of scientists who eschew similar personal considerations and tales from their scientific writings still have them, as science never happens in a void, being,

6 Castiello's (2019) introduction to *Vegetal Psychology* for the Italian audience is a good example of a very useful book written in a very different way. It reports analytically a fair deal of contemporary research on the topic, including the reports of some disagreements, and offers only a few deviations from its introductory objectives. Despite aspiring to be a "neutral" first book on plant cognition, as its language is well-balanced and essential, its very existence and some choices are very much the embodiment of a stance that is not obvious to take. I will return to this book's linguistic choices later.

rather, a situated human endeavor (cf. Raffaetà, this issue).

While I contend that Gagliano's approach breaks down the dichotomic framing of the disagreement, there are indeed people sitting on the opposite side. Several articles report forceful and total opposition to the very idea that plants can be cognitive (to only name a couple of recent ones, Robinson, Draguhn 2021; Mallat et al. 2021). So, in accordance with Legrenzi's insight, there is indeed polarization. Now I wish to delve into an additional reason that might explain why this is the case. Let's consider a pilot study (Khattar et al. 2022) that, despite some limitations, tried to gauge the sentiment about plant cognition between academics in natural and social sciences. An important axis was the correlation to resorting to "Traditional Knowledge", i.e. indigenous and usually non-Western and/or non-academic systems of belief and knowledge, and the propensity to talk about plant intelligence. As expected, the correlation was positive.

This connection is crucial. Gagliano's experiences as a (Western) scientist are telling in this respect. The negative gut feeling toward talk of plant cognition can be explained in terms of a dilemma. If one finds themselves readily accepting those views on how minds are to be found in unexpected places, on further consideration it may feel like renouncing a long-standing tradition in our intellectual canon. That feeling can be worrying, too. This is probably what happens when one is involved in first-person in a change of *Weltanschauung*. On this interpretation of the disagreement, the fine-grained scholarly discussions may end up appearing stale, even though they are indeed what caused the switch. An average skeptic academic cannot renounce a fair amount of detailed evidence to let the "conversion" process in their own belief system begin. One perhaps all too easily relativistic slope is facilitated by the Traditional Knowledge correlation: many would feel to be renouncing Western science as they know it, conferring a negative connotation to a similar outcome. For instance, Gagliano (2018, Chapter Y) herself reports episodes of easily-spoken dismissive skepticism toward her ideas and hypotheses – before they received considerable funding.

In other words, I am suggesting a two-fold observation.

One way to describe the situation is the following. There is a two-way movement between the discussion of the scientific merit of an issue (e.g., "can plants have cognition?") and the fact that it touches sensitive spots in scientific self-constructions of scholars *as scholars*.

Another closely connected way to put it is to claim that it seems that accepting plant cognition – or other related issues, like nonhuman agency (Kohn 2013) or the intelligence of materials (Tripaldi 2022) – equals or leads to renouncing one or more pillars of Western science and philosophy. This worry can emerge more or less explicitly.

I will now expand on both aspects of the observation across the following two paragraphs.

## 3.1 The Metascientific Argument

Alpi et al. (2007), in a very short critical note, signed by 33 botanists and biologists affiliated with more than 20 European and North American institutions, admit the heuristic value of talking about "plant neurobiology", while strongly suggesting that the provocative label had outlived its usefulness. After a dozen years, Mallat et al. (2021), after a step-by-step refutation of 12 claims in favour of plant consciousness found in the work of "a vocal handful of botanists", conclude by mentioning the risk that "young*, aspiring plant biologists*" (emphasis in the original) could be fed "mistaken ideas" about the state of the art of plant biology. A dangerous outcome to the future of the discipline itself, "because dubious ideas about plant consciousness can harm this scientific discipline". Two institutional corollaries are equally denounced.

Namely, a restrictive turn in research regulation in light of the alleged conscious experience, a notion that could attract more funding from agencies by virtue of its "strong, romantic appeal". Robinson, Draguhn, Taiz (2020) lament a decade of efforts directed towards the separation of "fact from fiction" with regard to the more extreme claims of "neurobiologists": they argue "that there is no solid scientific evidence to support the claims that plants possess neurons or have the equivalent of a brain, feel pain or contain a memory" (Robinson, Draguhn, Taiz 2020). In a direct response, Baluška and Mancuso (2020) turn over the accusation of being unscientific to their critics. The latter are accused of ignoring evidence, using straw-man arguments, resorting to non-peer-reviewed journals to offer methodological critiques, and – finally – of being dogmatic as they refute new ideas *a priori* on purely terminological grounds. The last issue will be addressed in greater detail below.

The importance of this brief give-and-take between prominent representatives of the opposing camps is not to be exaggerated in how much it tells about the nature of the contemporary debate, whereas Taiz et al. (2019) offer some more placid yet intriguing observations for the present discussion. There, the authors group some different kinds of arguments against the 'neurobiological' trend. Some are lexical and revolve around the loose definitions of concepts like 'intelligence', 'cognition' or 'learning'.[7] Taiz and colleagues are hostile to the extended interpretation of the aforementioned concepts, but care to underline that they hold a restrictive view because there is no (conclusive) empirical evidence for a conceptual revision.

7 An anonymous reviewer asks to provide an example of the loose definition. Gagliano et al. (2014, mentioned in Gagliano 2022 as well) experiment on *Mimosa pudica* described as "remembering" fits the scope.

The most "provocative [and] controversial" view – championed by Gagliano – is the attribution of consciousness, including feelings, to plants. This hypothesis is presented as something that does not follow and is not warranted from the experimental work – and neither necessary to support its conclusions. Gagliano (2017) says that plants display "a subjective system of feelings and experience". Taiz's group describes an attitude like hers in two ways. At first, they explain it in terms of poetic and metaphorical thinking. Then, more interestingly, they try to make sense of it in a more rationalizing way by tracing its roots back to an "ethical perspective [that] permeates [the] intellectual foundation" (Taiz et al. 2019, 685-6) of plant neurobiology, which they also describe as a "new wave of Romantic biology". They quote Gagliano (2017) stating that growing "experimental evidence for the cognitive capacities of plants" makes it more urgent to deal with "the controversial (or even taboo) topic regarding [plant's] welfare and moral standing". She concludes by expressing the conviction that "our ethical responsibility toward them can no longer be ignored". Taiz and colleagues claim to share every concern about the grave decline that the Earth's environment is undergoing nowadays, for instance in terms of loss of biodiversity. Nonetheless, they "strongly object to the implications that plant consciousness, intentionality, and cognition are moral or ethical questions. A scientific understanding of nature requires only that we seek the truth" (Taiz et al. 2019, 686).[8]

Three comments on this opinion article should be made.

Firstly, it seems clear enough that the rationalizing spirit of the second interpretation aspires to be a charitable one, even though both interpretations lead to the same unfavourable conclusion. According to Taiz and colleagues, that kind of science is not rigorous and, as a consequence, should be disregarded or, alternatively, called philosophy, or poetry. Let me try to schematize. Unwarranted analogies, inventive thinking, inconclusive evidence: these are the ingredients of plant neurobiology, on to the Uncharitable Interpretation (UCI). As such, they lead to bad science. The Charitable Interpretation (CI), instead, sees bad science as "inspired" by "justifiable" concerns that are ethical in nature. In other words, CI interprets scholars insisting on plants' cognitive abilities as striving to find a widely convincing argument for better treatment of plants on a mass scale, in the wake of the studies on animal cognition and animal ethics (cf. Trewavas et al. 2020). The argument, of course, is thought to be more convincing because it is presented as "scientifically-proven

8 For the sake of clarity, Taiz and colleagues stick to the standard view that consciousness in *animals* is most likely granted by their brain and nervous system. Since plants lack these two, they must lack consciousness as well.

evidence", and not as a naïve fantasy.[9] In other words, from a critical standpoint, it is charitable to interpret unscientific-sounding claims as justified by reasonable beliefs (in this case, a preoccupation), albeit of a different nature, whereas the uncharitable attitude does not admit such claims as acceptable despite their noble motivation.

Secondly, there seems to be an inversion in the argument reconstruction. Taiz and colleagues describe the plant neurobiologists as "inspired" by an ethical thrust. The quote taken from Gagliano (2017) they use to confirm their diagnosis, however, says the opposite: it is *from* scientific evidence (i.e. the belief in the discovery that plants are cognitive and/or conscious) that a set of subsequent ethical preoccupations arises. Of course, the critics may well be consciously interpreting the words of their target in a less literal way and I admit that would not invalidate their critique. However, the inverted reconstruction can come across as inaccurate.

Thirdly, the final line of the paper sounds somewhat scary and leaves the door open to the kind of metascientific arguments advanced by Gagliano and others (see the remarks in Baluška; Mancuso 2020). If for Taiz and colleagues the statement that the only way of understanding nature in a scientific way is "to seek the truth" sounds like a good supporting argument, then we must interpret them as implying that the state of the art in plant biology cannot benefit *a priori* of *anything* different from what is already in place. To say nothing of the circularity with which the truth-seeking prescription is imbued: it seems that to comply with the investigation of truth one must limit themselves to the truth only. This would end up ruling out the very essence of scientific reasoning and practice, namely being open to revise truths, wherever evidence suggests to do so. However, it would be unfair – uncharitable, indeed – to limit us to the literal critique of an unfortunate wording. It is clear that what Taiz meant is different and worthier of discussion, namely that they think that those particular innovative and ambitious working assumptions have proven to be both ill-conceived and unable to deliver sufficiently convincing evidence.

9 In this picture, I believe that the CI differs from the Mere Honorific Conclusion illustrated by Colaço (2023, this issue), since MHC is defined as follows: calling something "cognitive" in order to render it "worthy of philosophical and scientific investigation". Here, instead, the point to be made is different. According to CI, calling plants "cognitive" does not meet the criteria of scientific reasoning. On the contrary, Taiz et al. (2019) distinguish between a scientific *versus* a philosophical approach to plant biology. Moreover, CI interprets plant neurobiologists as "merely honoring" plants with possessing cognitive abilities not as much as a somewhat deceptive argumentative tool to bring forth an urgent scientific and real-world agenda (namely, plant welfare, ecological preservation, etc.). I must specify that, with all this, I do not necessarily entail that Colaço's original characterization implied the contrast I presented here between being "merely honorific" and "urgently deceptive".

## 3.2 A Different Kind of Knowledge

To continue the exploration of the nature of the previous two-fold observation,[10] I will now consider a different set of arguments that, in the end, will prove relevant to both dimensions, namely the scientific and the metatheoretical ones.

The so-called Ontological Turn (OT henceforth) has created interest and attracted critiques across anthropology and philosophy in the last 15 years or so. I do not think that the consonances between the OT and the de-humanizing issues about mental properties discussed here are casual. Let me explain why.

Highly seductive just as much as it is contested (Ramos 2012; Brigati 2021), the OT advocates in favour of a change in the ethnographic practice, with reverberations in the production of anthropological knowledge. This is supposed to happen by means of a conceptual change in the interpretation of ethnographic data. The general premise is that anthropology should move away from its original objectifying attitude toward the people being studied. Viveiros de Castro, one of the better-known proponents, makes this prescription fall under a process of "a permanent decolonisation of thought" (Viveiros de Castro 2016, 75; Colajanni 2021, 13). To avoid a discussion of the loaded term "decolonisation", it will suffice to say that this need is part of a general trend in the discipline that recognizes that describing different cultures from an ideally impersonal vantage point – the one occupied by the ethnographer – is a method that leaves much out of the picture. In so doing, it exacerbates the "ventriloquist" posture that reports the thought of the studied people as if they could not talk themselves and use their own words to mean what they want to mean. One methodological remedy for the ethnographer is to "take seriously" what they are told and try not to impose their own categories on the native ones. So, the desired reduction of distance between the observer and the observed is meant to stem from a different attitude toward the latter's statements.

Thus, taking to further and radical lengths Wittgenstein's critique of Frazer (2018), the anthropologist is invited to take literally even the strangest reports received from informants. On this view, then, *A* saying that *p*, where *p*, for instance, consists in "*x* is *y*", is *not* – from the interpreter's standpoint – a rhetorical device (usually, a metaphor) used by *A* to say *q*, that, in turn, could consist in "*x* is *z*". *A* really intends to say *p*.

Failure to recognize (or accept) this leads to a two-fold undesirable outcome. Firstly, one commits an error in conducting good ethnography, ending up crushing the native categories of thought into one's

10 See section 3.

own. Secondly, I may add, not interpreting them as saying *p* despite the fact that they are saying *p* and reporting them as saying *q* – that is, giving them a voice through research products – amounts to committing discursive injustice (Kukla 2014; Bianchi 2021).[11]

Now, can this paradigm be useful to address the problems around the mind of, for instance, plants? The idea is worth exploring and two paths can be walked to do so. The perspectivist interpretative scheme could be applied to the specific content of de-humanized science as well as its metascientific approach.

Taking a step aside from OT, discussions like the one between Figdor (2020) and Machery (2020) are attempts at making sense of both the intentions of scientists and the fact of the matter. Said differently, the first question is "are scientists saying that, e.g., plants have minds because they mean it literally or not"? and the second question is "despite what their ideas are and whether they use quotes or not, is there a merit to the proposed notion?". Given the framing I gave to the problem, it seems to me that their disagreement may be helped (but not dissolved) by the acknowledgment that they are conflating the two questions. Machery (2020, 683) reproaches Figdor's alleged assumption that scientists in the field have a somewhat monolithic attitude toward the de-humanization of cognition issue. From such an assumption derives her literalist view, according to which "psychological predicates are being used to pick out the same scientifically-discovered structures across the relevant human and non-human domains" (Figdor 2018, 61). However, the tendency of both is to study the issue with an initial skimming of factors that are perceived as external to the fact of the matter (see the parts on rhetorical exaggerations in both papers). It is on those grounds that their disagreement between literalist versus polysemic interpretations of the language used in scientific papers of others is built.

I argue that this analytic way of making sense of the phenomenon may leave out something. Let us consider Gagliano's work once more. Taiz and colleagues criticize her statement for what concerns the fact of the matter (there is no evidence in support of the statement that plants, e.g., are conscious beings), but simultaneously they do not take similar claims seriously by suggesting that, after all, they are "really" motivated by ethical concerns. Thus, the "real" agenda of plant neurobiology is reducible to putting forward a reconsideration of the moral status of plants. However, on both levels, what Gagliano

11 I take this case to be describable both in terms of discursive injustice (the native informant is blocked from being taken seriously and systematically interpreted as saying something different than what is said, thus is being illocutionarily disabled) and epistemic injustice (the native informant is getting systematically misrepresented in their system of belief and mode of knowledge production). However, this is not the place to elaborate on this point.

(and others) do, according to the critics, does not belong to science.

Let us now 'take seriously' Gagliano's (2022) perspective in her own words, starting with the metascientific level. When she tells us that plants, rather than "inspiring" her work (as Taiz et al. say), "provide instructions" on how to conduct experiments on plants (sometimes, on different plants than the ones who do the talking),[12] we probably should not interpret her as speaking metaphorically. In effect, there is nothing that explicitly induces such a reading. What is striking is the fact that these unapologetic reports of extra-scientific episodes are followed in a continuous flow by lab experiments published in peer-reviewed biology journals (Gagliano et al. 2017). At this point, a crucial question arises: how much influenced by these anecdotes should a "serious" reading of Gagliano's cognitive predicates with regard to plants be? Does the fact of the matter consist in propositions that belong to something different than Western science? In her own words, Gagliano believes that academic training in science is of fundamental importance; nonetheless, it is too narrow-minded and needs to be augmented with different means of inquiry.[13] In fact, Gagliano explicitly draws on traditional knowledge, to be found in Aboriginal Australian, Amazonian, North American indigenous communities. Not only theoretically, but also practically: one of the pillars of the book are the actual encounters with shamans and plants. According to the author, first-hand experience is the only measure of the value of these deviations from standard scientific practice learned in Western academia.[14]

At the same time, Gagliano does not limit herself to proposing a simplistic substitution of Western science with traditional ways of producing knowledge and its practical application – something similar would be uninteresting as much as limited. She argues, instead,

**12** Consider this passage, for example: "By juxtaposing the apprentice shaman, wide open to the darkness of a Shipibo *maloka* in a defiant wilderness, with the Western scientist locked under the brightness of fluorescent lights in an off-limits controlled-environment laboratory, nature had found a way to integrate and unify the two worldviews. Guided by the plants, the scientist learned to think out and away from the conventional box that measured current scientific precincts, while the shaman inspired an entirely new vision" (Gagliano 2018, Chapter O).

**13** An anonymous reviewer recommends Levy and Godfrey-Smith 2021 and Longino 1990 as instances of reflection about ways to integrate scientific training with imagination and other humanistic-inclined forms of reasoning. I gladly welcome these suggestions and add Batisti (forthcoming) to the list, a commentary on epistemological pluralism and the rethinking of scientific objectivity.

**14** "I felt so naïve and, at the same time, so hideously parochial about the fact that my beliefs and perceptions of the world were tinted by the stinky old anthropocentric bias, despite the amazing experiences I'd had that had taught me otherwise" (Gagliano 2018, Chapter N; 2022, 101).

for an integration.[15] For instance, she warns against an unnecessary idealization of traditional indigenous cultures, just after stating that healers and shamans all over the world "have been learning the songs of plants as a way of communicating with these other-than-human persons and acknowledging them as the guarantors of human existence, the true philanthropists of the world" (Gagliano 2018, Chapter R; 2022, 44-6). The devaluation of "plants and the traditional knowledge of them" is then denounced as a form of "agro-scientific capitalism" where extractivist business supports and is supported by the conviction of the superiority of Western knowledge over what they conveniently consider as "unsubstantiated and fanciful belief system[s]". Gagliano finally wonders: "What if the claims of traditional knowledge were indeed put to the test and these 'beliefs' substantiated by a Western scientific model?" Would we discover some "'truth' emerging at the interface between these two bodies of knowledge"?

## 4 Conclusion: Pluralism in Language, Pluralism in Science

From the application of a – loosely defined – perspectivist analytical lens to the de-humanization of cognition in plants it has emerged that one needs to ask both of the two questions: one about the merits of the proposal and one about the kind of science (or knowledge) that is being done in that context. In this essay I have highlighted that rebuttals such as Taiz et al.'s (2019) do address them both, but in a disordered way. On the other hand, important analyses (Figdor 2018) and their friendly critiques (Machery 2020) do something similar even if they don't express themselves on the merits of the scientific truths discussed by the de-humanizers of cognition. Let us consider briefly Machery's counterproposal to Figdor's literalism, namely polysemy. His view holds that stating that plants have cognition only adds new meanings to the term 'cognition', without supplanting the previous one(s). Now, does such an analysis allow for – or literally consist in – some kind of pluralism? Does semantic pluralism entail a metascientific pluralism, if we want to give room to the worry of Robinson, Draghun, and Taiz about the fact that accepting the validity of plant neurobiology leads to a renounce of Western science as we know it? This is not the occasion to provide an answer, but with

15 In criticizing the widespread biotechnological programs as they treat plants as "inert objects", Gagliano (2018, Chapter A; 2022, 145-6) claims that such a view is unsupported by evidence: "the scientific method demands us to rectify our approach by de-objectifying plants and no longer granting scientific legitimacy to G[enetically] M[odified] plant research", in light of the "growing plethora of scientific evidence demonstrating that plants are highly sensitive living organisms".

this question I wish to make clearer how the grammatical issue is related to the metascientific one and answering one without answering the other amounts to a limited interpretation of this trend in philosophy and science.

It may well be that in some, easier cases the two aspects can be separated without harm. Castiello's (2019) introduction, for example, seems quite unproblematic, thanks to the extensive use of "scare quotes" when attributing cognitive predicates to unconventional vegetal recipients (cf. Figdor 2020 on scare quotes). That remains true even on a closer analysis that shows that Castiello does use scare quotes, but mostly for focal concepts and does not in longer sentences – probably for stylistic reasons, i.e. to increase the readability of the text.

However, I have shown how in more complex cases, like Gagliano's research as well as its critiques, the two levels – scientific and metascientific – are interwoven and in a reciprocal influence. Therefore, they should be taken into separate consideration. When asking whether plants, neurons, bacteria, or even financial markets have minds, or pieces of it, one should ask what kind of knowledge is being discussed in that context. Likewise, discussions about the differences and possible integrations between Western science and traditional knowledge need to be based on fact-of-the-matter grounds. Finally, this paper was meant to serve as a non-dogmatic and yet critical way to react to the bewilderment that philosophers, scientists, and the general public can feel when confronted with similar provoking pieces of contemporary research.

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